AUGUST
1955

Amateur Radio

WIRELESS INSTITUTE OF AUSTRALIA

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WI BROADCASTS

All Amateurs are urged to keep these frequencies clear during, and for a period of 15 minutes after, the official Broadcasts.

VK2WI: Sundays, 1100 hours EST, 7146 Kc. and 2000 hours EST 50 and 144 Mc. No frequency checks available from VK2WI. Intrastate working frequency, 7125 Kc.

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VK7WI: Sundays, at 1000 hours EST, on 7146 Kc and 146.5 Mc. No frequency checks are available.

AMATEUR RADIO

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EDITORIAL

★

CLOSING OUR RANKS

In response to Federal Executive's invitation to Divisions to provide "Guest Editorials," VK4 has entrusted the first contribution to the pen of one of its old timers, VK4HM.

Since its inception, Amateur Radio has experienced its difficulties and its triumphs. The difficulties have been overcome by the Amateur's tenacity of purpose and the unity and strength of the organisation representing his interests. The triumphs have not always received the recognition they deserved.

The assaults of non-co-operative nations, commercial interests and dissenters within the Amateur ranks have failed to wreck our organisation, due in the main to the energetic and tactful leadership of our Federal and Divisional Councillors, supported by loyal members of the rank and file.

Important and vital issues are at stake, particularly the fight for the retention of our existing frequency bands against the encroachment of commercial interests—**now is the time to close our ranks.** All Amateurs must present one solid front to meet the challenge of our adversary. We must prepare **now** to give full and ample support to our delegates at the next International conference.

Dr. Raymond Bowers, of the University of Rochester, U.S.A., has had this to say about Amateur Radio: "It is the means of communication with others on equal terms; of finding friendship, adventure, and prestige while seated at one's own fireside. In picking his human contacts out of the air, the Amateur is not seen by them; he is not known by the clothes he wears, but by the signals he emits. He enters a new world whose qualifications for success are within his reach. There are no century old prejudices to impede his progress. He enters a thoroughly democratic world where he rises or falls by his own efforts. When he is a beginner, the radio elders help him; and when he becomes proficient, he will willingly help the younger generation. At the close of the day, filled with the monotonous routine of the machine age, he can find adventure, vicarious travel, prestige and friendship by throwing in the switch and pounding his signals on the air."

Reading such a statement should make us proud of the fact that we are members of the great fraternity of Radio Amateurs.

After refreshing your memory by re-reading the "Amateur's Code," you will surely agree that these ideals are worthy of preservation. Resolve to do your part to preserve the ideals so nobly inspired by the splendid pioneers of Amateur Radio.

Let's close the ranks and give of our best to achieve the progress and prosperity of our organisation—the Wireless Institute of Australia—by regularly attending meetings, supporting the Council and assisting all Amateurs, spreading the gospel of the "Amateur's Code" wherever possible.

FEDERAL EXECUTIVE.

THE CONTENTS

120 Watts of Audio Without Driving Power 2
Let's Build a Tower 5
A Practical Vacuum Tube Voltmeter 7
An Introduction to Two Metres 10
6146 Beam Power Amplifier Data 12
Victorian All Models Exhibition 14
Remembrance Day Contest, Variation of Awards 14
Amateur Radioteletype 17
Fifty Megacycles and Above 19
Book Review—New Zealand Amateur Call Book 19
Amateur Call Signs 20
Ross Hull V.h.f. Contest Results Amendment 20
DX Activity by VK3AHH 21
Prediction Chart for August, 1955 21
Federal, QSL, and Divisional Notes 23
Correspondence 28

120 Watts of Audio Without Driving Power*

CLASS ABI MODULATOR WITH 6146s

BY GEORGE GRAMMER, W1DF

● Unlike most tubes, the 6146 will develop almost as much power output without driving power as with it. This article describes a complete modulator unit that takes advantage of this characteristic. Various power levels can be obtained, depending on the choice of power supply components.

The modulator includes a splatter filter, made from inexpensive components, that can be applied to practically any phone transmitter where the Class C plate current does not exceed about 300 Ma.

The first two stages of speech amplification are built into a small box that may be used at the operating position while the main chassis is installed in any convenient location.

THE rather interesting capabilities of the 6146 as a Class AB1 audio amplifier do not seem to have attracted much attention in Amateur circles, although it is a fact that a pair of tubes is capable of delivering practically the same audio power in AB1 as in AB2. Either way, it is possible to get enough power to modulate a Class C input of a quarter kilowatt. When a choice is available, it is hardly likely that anyone would select AB2, with its driver regulation problems, in preference to AB1—especially when no-driving-power operation usually means that one less speech amplifier stage will be needed for the same over-all gain.

The modulator uses a pair of the tubes in AB1 and, with the exception of the preamplifier unit (which could easily have been included on the same chassis if it had been desired) is complete with power and bias supplies on a 7 x 17 x 3 inch chassis. The preamplifier was deliberately made into a separate unit in the thought that, while it is highly desirable to have the microphone input and gain control within easy reach at the operating position, there is no reason at all why the rest of the audio equipment should be in the same vicinity. The modulator and power supply have no controls that need be manipulated, nor do any of the tubes or components require watching during transmitting periods. This section can simply be tucked away in some spot where it will not take up room that might be used more profitably for other purposes.

The modulator power supply unit includes one stage of speech amplification, and also is equipped with a splatter filter and an audio take-off for 'scope monitoring. It is easy to build in the latter two at the start, but somewhat messy to add them externally after it becomes appreciated that they should be classed as necessities rather than accessories.

TUBE CAPABILITIES

The audio power that can be obtained from a pair of tubes is, of course, a function of the plate voltage used on them. The following table is illustrative:

Plate Voltage Power Output Load Resist

Plate Voltage	Power Output	Plate-to-Plate Load Resistance
500 volts	**84 watts**	**4,200 ohms**
600 volts	**104 watts**	**5,200 ohms**
750 volts	**134 watts**	**6,700 ohms**

The power output figures are calculated from data taken from the published tube curves, using a screen voltage of 200, and the actual outputs will be somewhat lower because of losses in the output transformer. These "theoretical" output figures cannot be compared directly with those given by the tube manufacturers in tables of typical operating conditions, partly because of somewhat different choice of load resistance and partly because the manufacturers' figures usually are based on the fundamental-frequency component of power output, with distortion components given separately as a percentage.

The figures in the table above are more properly described as the average power in a sine wave having the same instantaneous power at the peak of an a.f. cycle as the waveshape actually considered—or, for short, "equivalent sine-wave power output." Since it is the **peak** power that counts in determining the modulation percentage, and all our discussions of modulator power use this same "equivalent sine-wave power" as a basis, we believe this kind of figure to be more useful in modulation calculations with voice waveforms.

Suitable sets of components for all three of the voltages listed above are readily available, so the power level can be selected to suit the Class C amplifier to be modulated. For purposes of estimating, measurements have shown that the actual power outputs to be expected are approximately 75, 95, and 120 watts for the 500, 600 and 750 volt conditions, respectively.

THE PREAMPLIFIER

The preamplifier circuit, shown in Fig. 1, is built in a 2 x 4 x 4 inch aluminum box. It uses a 12AX7 for two resistance-coupled triode stages. The circuit is quite straightforward, except for the fact that a 0.003 uF. condenser is used for coupling between the first and second stages. The object of this is to help taper the low frequency response for more effective speech work. Comparatively, the time constant of the input grid circuit seems quite large, but the effective resistance from grid to cathode is much lower than the 2.2 megohm resistor would indicate because of the flow of "initial velocity" electrons in this circuit. This current flow provides the operating bias of about 1 volt. (It should not be confused with the grid current that results from rectification of an applied signal; there is no rectification of the latter type in this case.)

The 12AX7 is mounted on a small bracket fastened to one removable side of the box. With the exception of the microphone connector and gain control, which are on one edge of the box, and the connector, J2, on the opposite edge, all components are on this same plate, mounted between appropriate tube socket pins and tie point strips. Enough lead length is allowed from the components on the box itself to permit taking off the plate to get at the wiring. Rubber feet are mounted on the other removable side of the box, which becomes the bottom when unit is in use.

The preamplifier is connected to the modulator through a 10-foot length of cable, having one shielded and two unshielded conductors. The shielded wire, connected to Pin 3 of J2 in Fig. 1, is used for the audio output. The shield is the common ground connection through the cable. One of the other two wires is used for plate current and the last for filament current. The shielded wire in this length of cable has a capacitance of about 500 pF., and since this capacitance shunts the output circuit there is considerable reduction of high frequency response in the cable —about 4 db. per octave above 1,000 cycles. This is compensated for in the modulator unit.

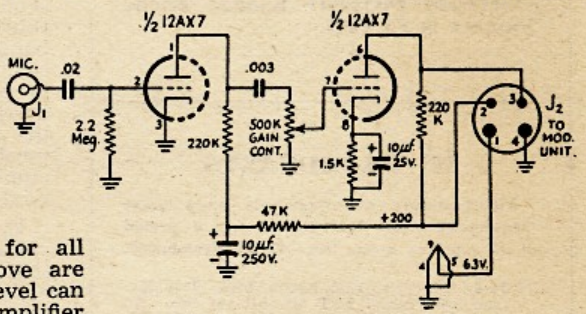


Fig. 1.—Preamplifier circuit.
Fixed resistors are ½ watt.
Capacitances in uF.
J1—Microphone connector.
J2—Four-prong connector, chassis mount., male.

MODULATOR AND POWER SUPPLY

The circuit diagram of the modulator and power supply section is given in Fig. 2. The "high-boost" circuit, consisting of the two resistors and 270 pF. condenser associated with the grid of the 6C4 speech amplifier, compensates for the drop in highs in the cable coming from the preamplifier. Since low frequency attenuation is desirable, an inexpensive interstage audio transform-

* Reprinted from "QST," December, 1954.

er is used for coupling the speech amplifier and modulator. The modulation transformer is a multimatch type delivering output to the load through a splatter filter, about which more later.

The three 1 megohm resistors form a voltage divider for delivering about one-third of the total audio output voltage direct to the horizontal plates of a monitoring 'scope for forming a trapezoidal pattern without amplifiers in the 'scope. The resistor values can be varied, if necessary, to secure the proper pattern width, although the total resistance should be maintained in the neighborhood of 3 megohms for a 0.005 uF. coupling condenser. This condenser should have a voltage rating equal to at least twice the d.c. plate voltage on the modulated amplifier; 6,000 volt paper condensers in this capacitance are readily available and inexpensive.

Plate power for all tubes is supplied from one transformer. A single section choke-input filter is used for the high voltage applied to the plates of the 6146s. This is dropped through a resistor and a pair of VR105s (OC3) in series to provide a regulated voltage of 210 for the 6146 screens. This voltage also is applied to the plate of the 6C4 speech amplifier and, with further filtering by the 4,700 ohm resistor and 8 uF. condenser, to the preamplifier tube plates through pin 2 of J3. The dropping resistor, R2, should be adjusted to approximately 5,000 ohms with a 500 volt supply, 7,000 ohms for 600 volts, and 10,000 ohms for 750 volts. This adjustment can be checked when the modulator is in operation by observing whether the VR tubes go out on voice peaks. Enough current should be bled through the regulators so that they stay ignited at all voice levels.

A pair of terminals is provided for connecting a milliammeter in series with the plate lead to the 6146s. The meter itself can be placed in any convenient spot. If it is not used, a jumper must be connected across the terminals. This circuit is fused to protect the meter.

The bias supply uses a small filament transformer, T4, operating from the regular filament transformer, T3, to provide 115 volts for the bias rectifier and filter. Bias is adjusted to the proper value by means of R1. This supply does not have to be "stiff" since no rectified grid current flows through it in normal Class AB1 operation, but the resistance should be moderately low. If too much resistance is used in R1, occasional peaks that do go into the grid current region will cause a temporary change in bias through charging the bias filter condenser which then cannot discharge rapidly enough through R1. The values indicated have worked out well in practice.

Separate a.c. input connectors are used for the filament and plate supplies; when S1 and S2 are closed these can be controlled by remote switches. The bias supply goes on with the filaments, and since there is no time lag in the selenium rectifier the 6146s are always protected.

CLIPPING AND FILTERING

A high-level splatter filter can be built from parts that can be obtained quite inexpensively from practically any supply house that handles service components. The cost of the one incorporated in this modulator is only a little over three dollars.

The application of the filter is based on principles outlined in "QST" some time ago.† In brief, its purpose is to suppress audio components beyond about 3 Kc. in the modulator output, particularly those generated by clipping that may take place, either intentionally or unintentionally, in the modulator. The legitimate high frequency components of the average voice are seldom of any real consequence in causing unnecessary interference; the bothersome "splatter" is practically always the result of clipping, either in the modulator because of insufficient power output capability or overdriving, or in the Class C modulated stage itself. In the latter stage, the usual cause is overmodulation on down peaks, but improper operating conditions resulting in poor linearity also will result in splatter. No splatter filter can overcome imperfections in the Class C stage, nor can it compensate for the clipping that takes place when the plate voltage "hits bottom" on the down peaks of modulation.

In other words, the first step in splatter elimination is to adjust the modulated Class C amplifier for good linearity—that is, make sure that it is really capable of 100 per cent. modulation. Next, steps must be taken to ensure that the applied modulation cannot exceed 100 per cent. in the downward direction; this is the function of clipping. With a Class AB1 modulator the clipping can take place either in the plate circuit, by adjustment of the load resistance as described by Bruene,† or in the grid circuit by driving the modulator grids positive during the peak of the audio cycle. When the modulator grids are driven positive by a Class A voltage amplifier such as the 6C4 in this unit, the clipping is quite effective because of the poor voltage regulation of the driver when it is called upon to deliver power. Preferably, the modulator load resistance should be adjusted so that clipping in the plate circuit occurs simultaneously with clipping in the grid circuit, since if clipping occurs in one circuit before the other, the power output is reduced below the maximum obtainable. However, the loss in output is negligible if the load resistance does not depart more than 10 per cent. from the optimum value, so exact adjustment is not really necessary.

In practice, grid current clipping is likely to predominate, and the output amplitude will almost automatically be at the right level if the Class C plate input is adjusted to be at least twice the audio output of the modulator (assuming the modulator load resistance is near the optimum value). The system should be adjusted so that clipping occurs at a modulation level of 90 to 95 per cent; this ensures that the clipping will be done only in the modulator and not in the modulated amplifier where the splatter filter can do nothing about it.

This modulator was not designed particularly for intentional clipping,

† Bruene, "High Level Clipping and Filtering," "QST," November, 1951.

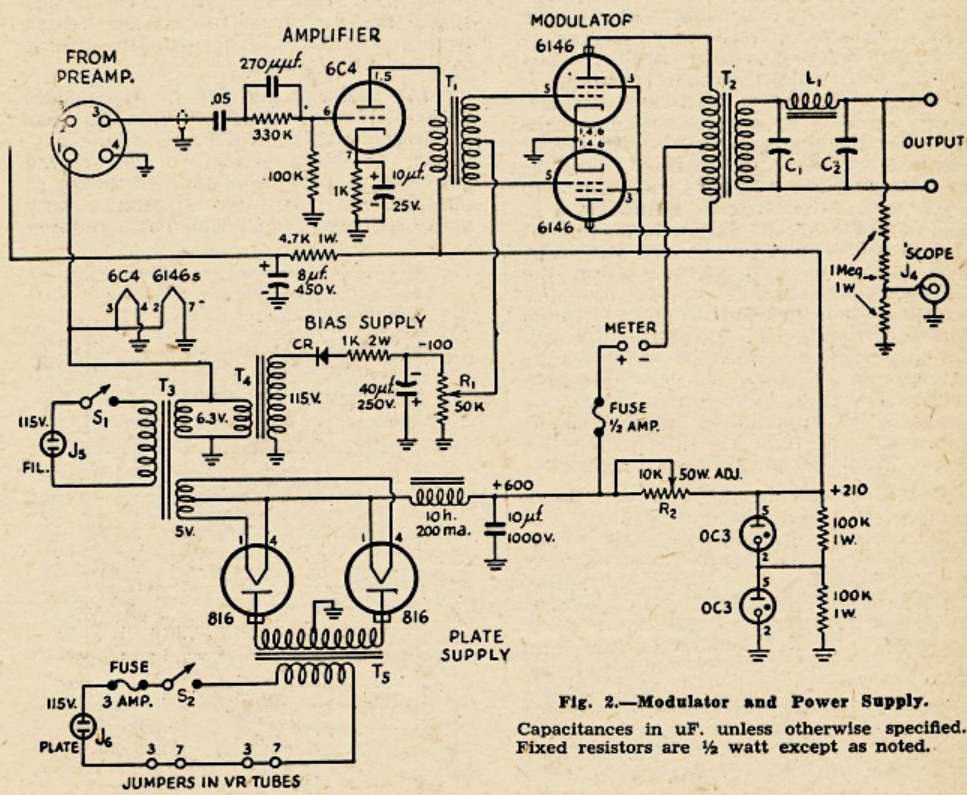


Fig. 2.—Modulator and Power Supply.

Capacitances in uF. unless otherwise specified. Fixed resistors are ½ watt except as noted.

C1, C2—1,600 volt paper. See Fig. 3 for values.
R1—50,000 potentiometer, preferably wire wound (bias control).
R2—10,000 ohms, 50 watts, adjustable.
L1—See Fig. 3 and Table 1 for values.
CR—Selenium rectifier, 20 Ma. or larger, for 115 volt operation.
J3—Four-prong connector, chassis mounting, female.
J4—Phono connector.
J5, J6—Male connector, chassis mounting.
S1, S2—S.p.s.t. toggle switch.
T1—Interstage audio, ratio 3:1, push-pull secondary.
T2—Multimatch modulation transformer.
T3—Filament transformer, 6.3 volts at 8 amp., 5 volts at 3 amp.
T4—Filament transformer, 6.3 volts at ½ amp.
T5—Plate transformer. For 500 volts d.c.: 1235 v. c.t., 310 Ma.; for 600 volts d.c.: 1,455 v. c.t., 310 Ma.; for 750 volts d.c.; 1,780 v. c.t., 310 Ma.

although there is nothing to prevent its being used that way to the degree permitted by the signal-handling capability of the circuits up to the grid of the 6C4. However, clipping is bound to occur in any modulation system unless special means, such as automatic gain control, are included for preventing it. Lacking such means, steps should be taken to prevent clipping from causing splatter. A splatter filter, plus the adjustment precautions outlined above, will do a good job of keeping the transmitted signal clean.

FILTER DESIGN

The filter used in this modulator is a simple one of the constant-k type. The inductance and capacitance required will depend on the Class C load resistance and therefore cannot be given in a single specification. The chart of Fig. 3 gives the design values for various loads from 1,000 to 10,000 ohms, for three cut-off frequencies, 2,500, 3,000 and 3,500 cycles. While a cut-off frequency of 3,000 cycles is probably optimum, the additional curves are given for the purpose of estimating the effect of having to use available values of components, particularly fixed condensers. For example, if the Class C load resistance (plate voltage divided by plate current in amperes) is 4,000 ohms, the chart shows that approximately 0.012 uF. should be used at C1 and C2. The nearest standard value in a single unit is 0.01 uF., and the chart shows that this is the proper value for a cut-off frequency of 3,500 cycles. The inductance could be chosen accordingly (0.5 henry, from the chart) or, as an alternative, 0.01 and 0.002 units could be connected in parallel. Neither approach is quite as clean-cut as it sounds, in view of the fairly large capacitance tolerances that are usually associated with paper condensers. The ideal method would be to measure the capacitances and pad them out to the correct values, and if the facilities are available to do this it is a recommended procedure. However, even quite wide departures from the theoretically correct values do not greatly affect the performance from a practical standpoint—that is, in the way the transmitter sounds or in the suppression of splatter. A reasonable procedure, therefore, is to pick out a standard value of capacitance that lies somewhere on the load resistance line between the 2,500 and 3,500 cycle curves.

It will seldom be possible to find an iron-cored choke having exactly the required inductance. However, it is easy to modify a "television" power supply filter choke for the purpose. These usually have ratings from 1 to 2 henrys at 200 or 300 Ma. Measurements on a "1 henry 300 Ma." choke of this type showed its inductance to be about 1.9 henry, without d.c. and with small applied a.c. voltage. Removing the entire stack of I laminations reduced the inductance to 0.53 henry. Calculations based on the total resistance and the wire size (No. 28) showed that the choke had about 22 layers, so 7 of these were unwound and the inductance was then measured with various air gaps, using paper and cardboard spacers. The measured values are shown in Table 1.

In the course of making measurements it was found that the presence of the "finishing" laminations that overlap

TABLE 1

Measured inductance values for various air gap spacings, "1 henry, 300 Ma." filter choke with seven layers (approx. 30 per cent. of turns) removed.

Air Gap inch	Inductance henry
0.003	0.71
0.010	0.62
0.020	0.48
0.025	0.46
0.050	0.36
0.075	0.31
0.100	0.28
0.125	0.26
0.150	0.24

the I sections on each side of the core had a very marked effect on the inductance and Q. These end pieces cause a pronounced increase in inductance for a given air gap, as compared with the inductance when the end pieces are not assembled with the regular core pieces. They also reduce the Q of the coil to less than half the value obtained when they are not used, presumably because of flux concentration in the small cross section of the overlapping part. They were therefore not used in making the measurements in Table 1, nor in reassembling the choke, the whole works being held together by clamps made from tempered Presdwood. The Presdwood mounting also serves to insulate the core from the chassis, which should increase the coil-to-chassis break-down voltage.

Table 1 shows that for air gaps above 0.020 inch, the inductance changes fairly slowly with the thickness of the gap, so in this range—roughly 0.25 to 0.5 henry—this particular type of choke as modified can easily be adjusted to any value required for Class C loads ranging

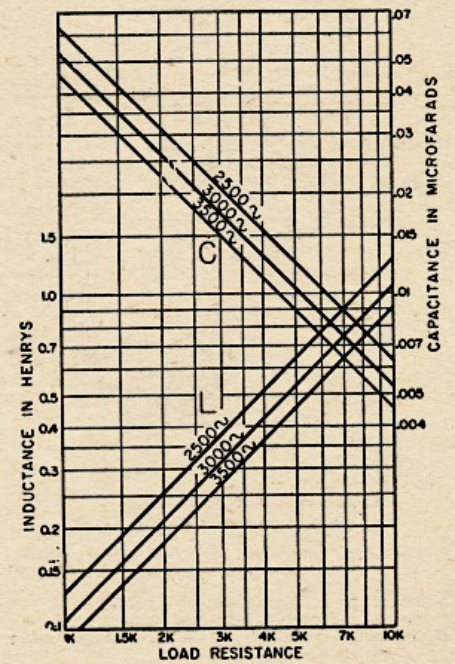


Fig. 3.—Splatter Filter Design Chart.
Values should be taken from L and C curves marked with the same cut-off frequency.

from 2,000 to over 5,000 ohms. This covers most of the practical cases. Measurement of the inductance is desirable but not necessary if the thickness of the spacer used in the air gap can be measured with moderate accuracy.

The inductance of a choke varies with the a.c. voltage applied to it as well as the direct current flowing through it. Because of the rather large air gap that is used in this application, the d.c. component is of practically no consequence. Checks showed, however, that the inductance increased about 15 per cent. at a.c. levels representative of full audio output from the modulator as compared with bridge measurements made with a low voltage source. An allowance of this order can be made in determining the proper air gap. The figures in Table 1 are based on bridge measurements of inductance.

PERFORMANCE DATA

The over-all frequency response of the system including the splatter filter is such as to tend to emphasise those frequency components that contribute most to effective speech transmission, without sacrificing that nebulous thing called "satisfactory quality." Judged by listening tests, the balance between highs and lows is quite satisfactory; also, there is no difficulty in identifying sibilant sounds such as "s" and "f" which often become indistinguishable when the highs are cut too much. The response curve is essentially flat (within ± 2 db.) between 350 and 2,800 cycles with the components and values given in the diagrams, and using a splatter filter designed for working into a 5,000 ohm load (measured values, 0.47 henry and 0.01 uF.). Compared with the level at a 1,000 cycle reference, the response is down 6 db. at 200 cycles and 12 db. at 100 cycles. At 3,000 cycles the response is down 4 db. below the same reference, and drops at a uniform rate of 20 db. per octave above 3,000 cycles.

Practically all of the attenuation at the high frequency end is in the splatter filter. The modulator and speech amplifier are intentionally cut only at the low end and the response stays fairly uniform out to 5,000 or 6,000 cycles. On the premise that the frequency components that cause splatter will practically always be generated in the modulator or Class C amplifier, as discussed earlier, the ones generated in the modulator obviously have to be suppressed between the modulator and Class C amplifier. Reduction of high frequency response elsewhere in the audio system accomplishes little or no splatter reduction—since the legitimate high frequency components in the ordinary voice are of low amplitude—and simply causes a loss of intelligibility and naturalness. In other words, there is no point in cutting the high end unless it is done in a splatter filter, located in the right spot to catch not only the legitimate components outside the needed band, but also the spurious components.

The measured power outputs at various voltages were mentioned earlier. The power supply filtering, plus low frequency cutting, result in a hum level that is largely masked by the first stage noise, without voice input and gain at maximum. At maximum output with a pure tone signal the hum increases be-

(Continued on Page 14)

LET'S BUILD A TOWER

BY JOHN HARLOCK,* VK6GU

The writer, like a lot of other Amateurs, has always looked with admiration and envy at a well constructed rotatable multi-element array. Particularly when the beam is mounted on a solidly built tower.

Like other Amateurs he, too, has heard stories about a VK6 who was given 10/- to remove a windmill tower, "Carriage Paid," but personally has found such bargains more elusive than rare DX.

After moving to his present QTH, he, by virtue of lack of space, was compelled to erect some type of beam. Obviously a beam must go somewhere up in the air. The problem was how to keep it there. The first solution was a 30 ft. length of water pipe. This was found to be quite satisfactory till winter gales caused one side of the quarter wave matching section to break away from one side of the driven element.

Now the problem of repairing this damage presented itself. Obviously if a sky hook had been available, this would have been used for keeping the beam in the air. So the problem meant lowering the whole structure or climbing up and effecting repairs.

The average Amateur must perforce be a man of many parts, but as steeple jacking does not enter into the writer's make-up, the whole assembly was laboriously lowered, repairs effected and the gang once more asked to assist in hanging the sky wire.

Isn't it amazing the number of excuses even one's best friends can think up at a time like this?

Again the problem of keeping the beam some distance from the ground had to be faced. Also, that best of teachers—experience—whispered loudly "this time you must be able to climb up to the works. No more lowering and raising!" What then? A tower!

As has been pointed out, a windmill tower in good condition was practically impossible to obtain. Well, why not build one? But from what material? Angle iron? A little hard to work, but worth a try.

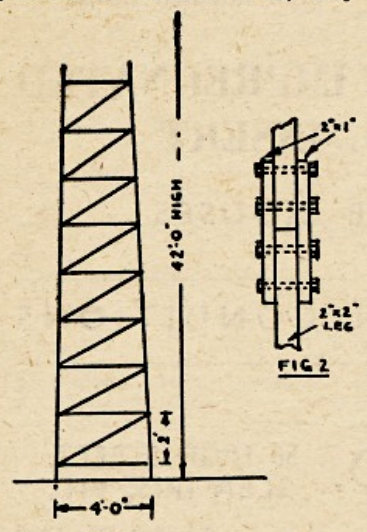


FIG 1

FIG 2

Investigation into cost and availability ruled this out.

One thing left—timber. Once more the bugbear of finance reared its ugly head and put imported, easy-to-work soft wood in the untouchable class along with angle iron.

In VK6 there are two alternatives remaining, both local eucalypt hardwoods, jarrah (eucalyptus marginata) and karri (E. diversicolor). Of the two, karri is more readily available in long lengths, is less liable to warp, stronger and is much the same price as jarrah, but more liable to white ant attack if "earthed."

Karri was selected and the design arranged to keep it above ground.

A 42 ft. high, 4 ft. base and 6 inch top square pyramid structure was decided upon, the design of each side being as in Fig. 1. A careful scale drawing was made and quantities calculated so that the timber could be ordered with a view to minimum wastage. Each leg comprises three pieces each 14 feet long of 2" x 2" bolted together as in Fig. 2. The lattice bracings are of 2" x 1", lengths being ordered so that offcuts from the lower braces could be used higher up, and also as the plates for joining the leg sections.

The timber was ordered and duly arrived, and after the now enthusiastic amateur carpenter had worn himself out carrying home large parcels of iron nails and bolts, some well meaning friend told him just what karri can do to unprotected iron. Galvanised bolts were advised, but were unprocurable.

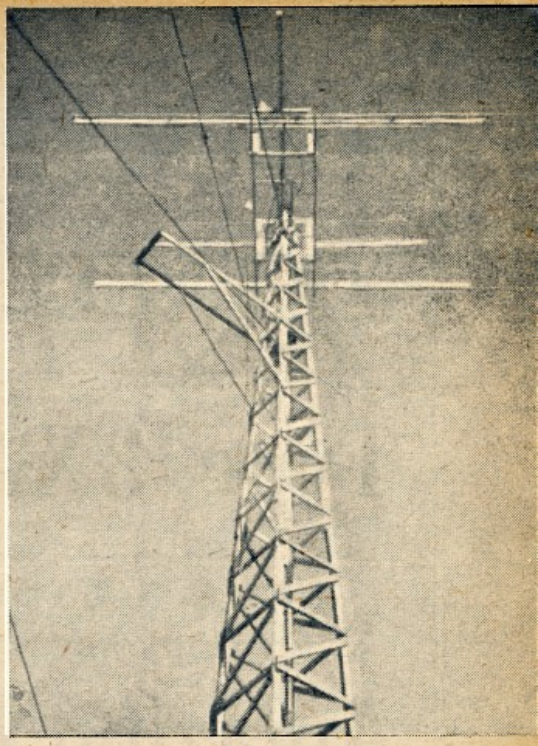
The services of a chemically-minded friend (at the time A.O.C.P. failed, now happily one of the gang) were availed of and the 32 iron bolts for the legs were hot-dip galvanised, amid splashing molten zinc, powdered charcoal and fumes of sal-ammoniac. The latter two to prevent the formation of oxide scum.

A humorous sidelight on this procedure occurred when the galvanising adviser, eagerly awaiting a much-needed cup of brew (to be prepared by the writer) caught the latter in the act of putting powdered sal-ammoniac into the teacups instead of sugar. The moral seems to be to drink a different type of brew, whose bitter taste needs no sugar to disguise it.

The alternative to nails turned out to be 2½" galvanised round-headed screws, available cheaply at the time. 18 lbs. in all were bought. The holes were drilled and the seven hundred odd screws driven home. Oh! My aching back! A screwdriver bit in the brace simplified screwing, but all holes had to hand drilled twice (shank and thread of screw) as an electric drill could not be begged, borrowed, or stolen.

Bolts were not considered because of the possible weakening effect, also hand galvanising of some 700 bolts could not be thought of.

Nails were used only to hold the lattice bracings in position before screwing.



CONSTRUCTION

The four legs were bolted together. One side was carefully laid out on the ground, the braces (21 horizontal and 21 diagonal) were temporarily nailed into position, then screwed (each with four screws). It must be stressed here that great care be taken with the "prototype" if satisfactory results are to be obtained.

Who was the VK6 who obtained plans from the writer and was heard to tell another VK6 that one side was 4" bigger than the other three?

The opposite side was assembled using the first side as a template, the two completed sides turned on edge and the bracing struts for the third side nailed and then screwed down. The whole assembly was then inverted (like other jobs it got heavier as it went along, possibly a little more so) and the tower finished. Cross braces were put at the 10, 20 and 30 foot levels to prevent twist in the tower. See Fig. 3.

FIG 3

In the meantime, some 2" x 2" x ⅜" angle iron (four pieces each about 5 ft. long) cement, bluemetal and sand (yes, sand, in VK6 sand-groper land, it's a scarce commodity in Fremantle which is built on limestone) were obtained by diverse means for very little cost.

The station wagon of the aforesaid chemically-minded friend, the smallest station wagon in the VK6 Division, did admirable service in transporting these necessities.

The Fremantle limestone makes an excellent foundation for a structure of this type, but did not improve either the writer's back or his temper when he endeavoured to dig holes in it. The holes were 3 ft. 6 in. deep (18" being in stone) and 1 ft. 6 in. square. Finally angle iron was bolted to the bottoms of

(Continued on Page 14)

* 15 Lilly Street, South Fremantle, W.A.

A Practical Vacuum Tube Voltmeter

BY JOHN MILLER,* VK2ANF

SOME years ago there appeared in "QST"[1] an excellent article by McMurdo Silver, in which he described a V.T.V.M. which has become the basis of practically all current designs. Subsequently a series of three articles in "A.R."[2] covered the same ground but dealing with some modifications to suit locally available parts. Despite the interest shown at the time and the extreme versatility of the instrument, very few have been constructed by Amateurs. Those few who have built them are loud in their praise for what constitutes a universal tool for the shack, test bench or laboratory.

It is probable that the complexity of the de luxe instrument has deterred many would-be constructors. The V.T.V.M. here described is an attempt to overcome these complexities without seriously detracting from the versatility of the instrument or adversely affecting the stability and accuracy achieved in the original instrument. The present design is also very much smaller.

The basic principles of the present instrument are the same as those of the larger de luxe model and the reader is referred to the previously mentioned articles for a discussion of the theory behind the design.

The basis of the V.T.V.M. is a balanced electronic bridge consisting of two triodes plus a sensitive meter to read the out of balance current. The use of the balanced circuit allows wide power supply voltage variations without shifting the meter zero, the instrument therefore being free from drift.

In the McMurdo Silver V.T.V.M. the first twin triode acted as the bridge and was run at very low plate voltage. This, whilst having considerable advantage in reducing the effects of gas current, means that very small changes in plate current result from the application of changing voltages to the grid. Thus, there is not sufficient current available to operate the meter, so a second twin triode stage was used to act as d.c. amplifier or meter actuating tube, allowing the use of a relatively insensitive meter.

The present design overcomes the need for a second stage with all the attendant complications. Four things are done to overcome the need for a d.c. amplifier.

1. The plate voltage of the bridge tube is increased.
2. A more sensitive meter is used.
3. The total resistance between grid and ground is reduced.
4. The heater voltage of the twin triode is reduced.

Experiments with increased plate voltage showed that no appreciable change took place in gas current effects provided the input resistance was lowered. Originally, the de luxe instrument had a maximum resistance of 40 megohms between grid and ground. This is unnecessarily high for most work so that the more conventional input resistance of 11 megohms is used, with a consequent decrease in grid current effects.

A further improvement is effected by reducing the cathode temperature of the bridge tubes by a reduction in heater voltage to approx. 4.5v. This allows the plate voltage to be increased to a point where sufficient plate current change is available to operate a microammeter. The use of a 0-100 microamp. meter is no particular disadvantage as the extra cost is more than saved by the reduction in components brought about by omitting the meter actuating tube. Meter manufacturers advise that down to 100 microamps. f.s.d. the ruggedness and reliability of a meter does not materially deteriorate.

It may be seen then that the only disadvantage shown by this design is the very slight one of reduced input resistance, and as already pointed out, this is not at all serious for general work. If, however, the need should ever arise for a very high input resistance, it may be readily achieved by adding multiplier resistances to the probe. Thus a x5 multiplier gives a total input resistance of 55 megohms for a f.s.d. of 7.5v. For most work, the 11 megohm input resistance is ample.

In the interests of simplicity, the d.c. current ranges were dropped from the present design, the standard multimeter being the most useful for measurement of current. Also the multiplier

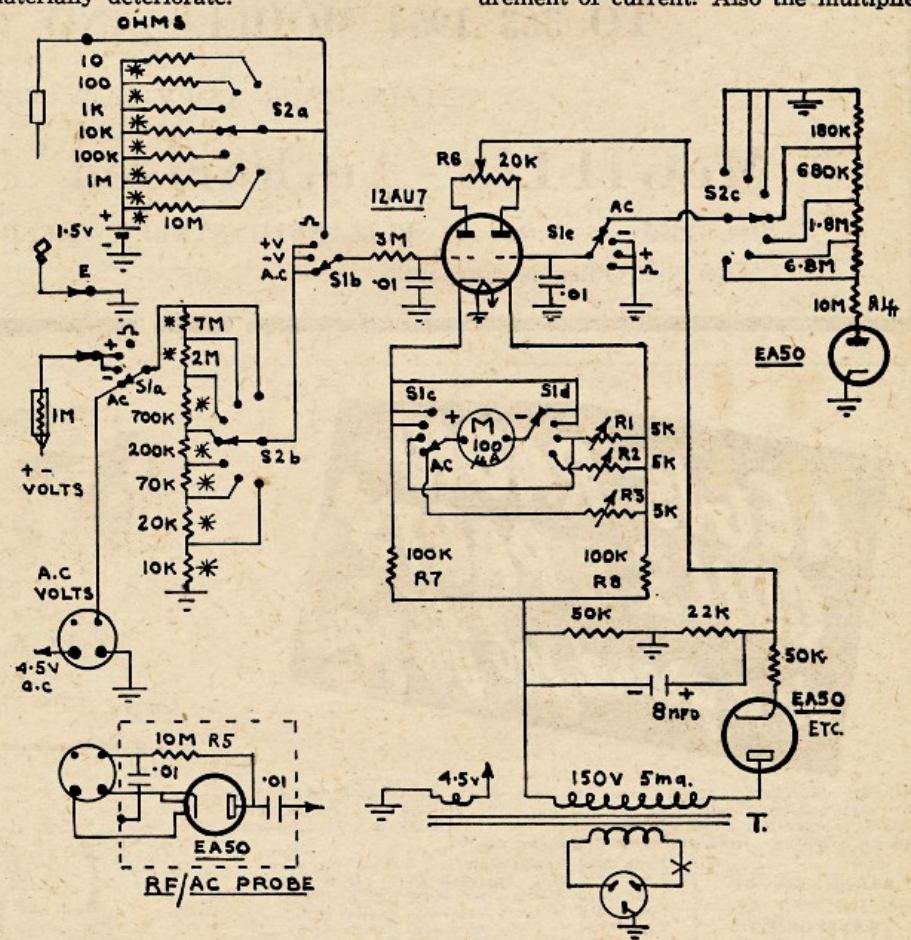


Fig. 1.—Schematic of V.T.V.M.

All resistors marked * are of low tolerance (1% or better).

R7 and R8 need not be 1% types, but should be equal in value to maintain a balance in the meter circuit.

R4 should be adjusted in value to give a balance (zero) on the a.c. volts range, 1.5v.

R5 may need to be smaller in order to obtain sufficient deflection of the meter when measuring a.c. voltage. It should, however, be kept as high as possible. Changes in the value of R5 will require a change in the value of R4 to maintain balance.

The potentiometers R1, R2, and R3 are the calibration controls. Only one, R2, should be brought to the front panel. R1 is "d.c. volts" calibration, R2 is the "ohms zero" set, R3 is the "a.c. volts" calibration.

R6 is used to balance the bridge, i.e. zero the meter, and is mounted on the front panel.

S1a-e is the function switch, 2 pole 4 position 3 bank.

S2a-c is the range switch, single pole 7 position (or 12 position) 3 bank.

S1 and S2 may be of the ordinary Oak type bakelite wafer switches.

T is the power transformer, shown as 150v. at 5 Ma. This will probably have to be a 150v./150v. 30 Ma. type, using only one half of the secondary. The 4.5v. required will therefore require a dropping resistor from 6.3v. as explained in the text.

The meter M should be as large as possible and scaled 0-15 and 0-5 with the added ohms scale according to Table 1.

* 21 Sutherland Street, Lane Cove, N.S.W.

terminals and resistances were omitted, the existing ranges covering all voltages liable to be encountered.

No special switches are required. In the larger instrument, the use of a very high resistance stick in the voltage divider dictated the use of low loss ceramic switches, however with only a total of 11 megohms in the resistance stick, ordinary bakelite wafer switches are quite in order.

Further simplification results from the use of single ½ watt resistors in the voltage dividers. These may be high stability 1% tolerance types or they may be selected for low tolerance. The size of the constructor's pocket will probably decide the issue!

CIRCUIT DETAILS

The circuit diagram of the V.T.V.M. is shown in Fig. 1. The 12AU7 acts as the balanced bridge tube, the voltages to be measured being applied to the grid of the left hand triode. D.c. voltage ranges are provided by switching up and down the voltage divider, which has a total resistance of 10 megohms. A 1 megohm resistor is housed in the probe to act as an isolating resistance so that circuit constants are not upset by application of the probe.

Switching the function switch to "Ohms" provides a very convenient set of resistance ranges in decade fashion with centre scale readings ranging from 10 ohms to 10 megohms. A.c. and r.f. voltages require the use of the external probe. Here again a change was made in the design compared to the original instrument.

By the use of a ceramic coupling condenser of 0.01 uF., the probe becomes suitable for both low frequency a.c. measurements and r.f. measurements. The inductance of these condensers is low so that error on r.f. measurement is kept low, whilst the capacity is sufficiently high to prevent any error due to capacitive reactance at low frequencies. It is possible that the single condenser may be running close to the wind on very high voltages, but no trouble has been experienced to date. The use of germanium diodes in the probe was considered but discarded due to the low inverse peak voltage permitted with such rectifiers. However, for measurement of fairly small voltages (25v. or so) the germanium diodes would probably give more accurate readings at fairly high radio frequencies.

No "A.c. Zero" control is fitted as it was found quite in order to adjust the series resistance in the balancing diode and leave it set. In any case, due to the high resistances in use, an a.c. zero control would require a fairly high resistance potentiometer which might be hard to obtain.

The power supply is simple as there are no voltages to be obtained for a meter actuating tube. The rectifier may be a half wave selenium type, or as shown, some small diode such as another EA50 or 6H6, etc. The 150 volt 30 Ma. transformer may be replaced by something smaller if facilities for making transformers are available. The secondary, which is not centre tapped, is only called on to supply about 5 Ma., so the 30 Ma. winding is much larger than required. The heater voltage may be obtained from a 5v. winding if the transformer has one, or a series resistor may be used to drop the voltage to somewhere between 4 and 5 volts. The exact voltage is not at all critical.

OHMS CALIBRATION

Ohms	Volts	Ohms	Volts	Ohms	Volts
0.5	24	8.5	230	35	389
1.0	45.5	9.0	237	40	400
1.5	65	9.5	243.5	45	408
2.0	83.5	10	250	50	417
2.5	100	11	262	60	428
3.0	115.5	12	272.5	70	438
3.5	130	13	282.5	80	444
4.0	143	14	291.5	90	450
4.5	155	15	300	100	455
5.0	166.5	16	309	200	476
5.5	177.5	17	315	300	484
6.0	187.5	18	321	400	488
6.5	197	19	327.5	500	490
7.0	206	20	333.5	1000	495
7.5	214	25	356	Inf.	500
8.0	222	30	375		

Table 1.

The figures in the OHMS column are marked above the appropriate points on the voltage scale, as given by the VOLTS column. The resultant scale of ohms represents the OHMS x1 range. Any convenient full scale voltage figure may be chosen to work out the ohms scale, the one above being 500. The formula from which the above table was prepared is—

$$M = \frac{FSD \times R}{r + R}$$

Where
- M is the meter reading in volts.
- FSD is the chosen scale deflection (e.g. 500 as in above Table).
- R is unknown or external resistance being calibrated.
- r is internal resistance selected by range selector (e.g. for ohms x1 the internal resistance is 10 ohms).

value, however, will only be correct when measuring pure sine waves. Peak to peak values will be 2.8 times the r.m.s. reading as shown by the meter, and will be correct. To illustrate this, assume the voltage shows 10v. on the meter, this is the r.m.s. voltage of a pure sine wave, but the same reading on a short duration pulse waveform is not the true r.m.s. value. However, in each case, the peak to peak value of 28 volts is correct.

No calibration is required on the ohm ranges, setting the "Ohms Adj." to full scale accomplishes this. Note that the meter is forward reading for ohms. The meter scale may be graduated in ohms by the use of Table 1. Alternatively, it may be possible to obtain a scale suitably calibrated, as at least one popular commercial instrument uses the same scaling. Other scalings may be used by suitable alteration of the voltage divider stick, but the ones shown are very convenient. Table 2 shows the full set of ranges available.

CONSTRUCTION

The instrument may be housed in quite a small space, which is a decided advantage not possessed by the McMurdo Silver V.T.V.M. This allows moving the meter to the job rather than bringing the job to the meter! The prototype was housed in a case 6" x 6" x 6"; a commercially made case and panel is available in this size.

No actual layout is suggested as this is not critical, the only points to be watched being the mounting of the resistors for the various ranges and the location of the grid by-pass condensers.

TABLE OF RANGES

Function Switch	Range Switch Positions 1	2	3	4	5	6	7
	Full Scale Readings						
Volts A.C.	1.5	5	15	50	150	500	1,500 *
Volts D.C. —							
Volts D.C. + ...							
Ohms	x1	x10	x100	x1k	x10k	x100k	x1meg *
Full Scale Reading	1k	10k	100k	1meg	10meg	100meg	1000meg
Half Scale Reading	10	100	1k	10k	100k	1meg	10meg

Table 2. * Switch Labels.

CALIBRRATION

Once having got the instrument ready for action, first switch the function switch to d.c. volts, either positive or negative. Now apply a fresh 1.5v. torch cell between the probe and earth and adjust the d.c.v. calibration potentiometer so that the meter just reads full scale on the 1.5v. scale. The whole set of d.c. volt ranges should now be correct.

Calibration of the a.c. volt ranges is accomplished in the same manner except that a source of a.c. voltage of known value is applied to the a.c. probe. The lowest range of a.c. volts (0-1.5v.) will not be quite linear, but it was not thought worthwhile to include a special scale. For this reason the a.c. ranges should be calibrated using a voltage source of something larger than 1.5v.

It should be pointed out that the instrument reading is proportional to the peak value of the applied a.c. voltage, though the calibration is most useful in terms of r.m.s. voltage. The r.m.s.

All resistors in the divider sticks, and also the ohms ranges, should be mounted on low-leakage material—mounting them on the switch banks is recommended, whilst the grid by-pass condensers should be mounted right at the grid pins to keep r.f. away from the grids during measurements around a transmitter.

Panel layout is conventional and the only controls brought to the front panel are the two switches, meter zero and ohms adjustment potentiometer. All other controls are of the screw-driver adjust type and may be located inside the case. It is not necessary to use shielded leads for the probes, but it is important that the components of the a.c. probe be shielded and the shield earthed. For convenience and safety in measuring high voltages, the d.c. probe may use small section co-axial cable with the shielding braid earthed. The case of the instrument should be earthed via the usual three core flex.

(Continued on Page 11)

AN INTRODUCTION TO TWO METRES

BY ROBERT H. BLACK,* VK2QZ

DESPITE the belief of the low frequency Amateur that there could not possibly be so few metres, there really is a two-metre band. It is hoped that this introduction will acquaint future denizens of the band with some of the inner mysteries of this microcosm.

Before we proceed further we must define **two metres**: Two metres is 2 mx and a little rough calculation will show that it is 144 megacycles per second (i.e. 144,000 Kc.). In earlier times the calculation was rougher and two metres was 166 megacycles. As the transmitters were modulated oscillators the slight inaccuracy did not matter. Nowadays, when you have your crystal controlled transmitter operating in the band, you are much more aware of your exact frequency than are those who operate on the lower frequencies.

The types you will meet on two metres are diverse. Some are browned-off old-timers who want to get away from it all, others are serving their time with "Z" calls, perhaps still trying to learn morse, whilst another group regard two metres in the same way as a small boy dismembering his first alarm clock. These last are addicts. Others, again, are **experimenters** who write **technical articles**.

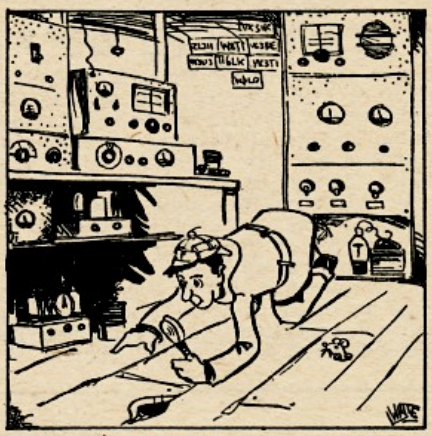
Before you can get going on two metres you must first of all **find the band.** This is an ordeal which must be endured by all who build their own equipment. It applies to both receivers and transmitters. The best receiver for two metres is a crystal controlled converter with a cascode in Sydney and a neutralised 6J6 in Melbourne as the front end. The views on the comparative excellence of these front ends are just as fixed as the opinions on the Melbourne climate and the Yarra River. Perhaps there are frequent meteor showers in Victoria, perhaps "QST" is read in one State and "CQ" in the other, perhaps no comparison has been made between the best gear in both States.

You will hear **noise figures** quoted; these are of academic interest unless you live in such seclusion that you see only one car a fortnight. Most Amateurs live in locations where **noise** (unfigured) is going to limit their reception rather than the nice distinction of 1 db. improvement in the noise figure. Noise will drive you or the XYL silly if you live in the city, where you will have to try all the **noise limiters** in the books and the magazines before you settle on your favourite. By the time you have tried all the various circuits you will have become accustomed to the noise anyhow and your wife will have left you.

In a crystal controlled converter you will use an **overtone crystal oscillator** and here there are three circuits, at least, to try before you find that your crystal is inactive on the particular overtone you want to use. If you have an active crystal, the circuit doesn't matter.

Well, you will eventually find the two metre band with your receiver after coming across the national f.m. broadcast transmitter and odd service signals including the N.R.M.A. These last signals may intrigue you so much that you won't perservere with the quest for two metres. But don't be waylaid; you will probably hear them again when you have found the band. It is handy to feed the converter into the receiver near your favourite short wave station so that you can listen to it during the periodic depressions when you want to hear a new voice for a change.

The **two metre transmitter** is quite different from the usual set-up on the lower frequencies. Instead of using tubes which will deliver adequate output to drive the next frequency multiplier, you must use small tubes, triodes at that, and squeeze and squeeze them in the effort to obtain **enough grid drive** to the final amplifier, and when the grid current reaches the right value it will mostly be due to oscillation. This is a matter of honour; the fellow who designs a transmitter with drive to spare is a cad. The caddish approach is advised.



". . . Two Metres—You must first of all find the band."

Finding the band with the transmitter can be attempted in one of two ways. The **cognoscenti** use a **grid dip oscillator**, whereas the others obtain output from the final and call CQ. These innocents find themselves tangled up with aircraft, taxi cabs or fire brigades and, even if they don't cause trouble, will certainly call their heads off and receive no answer on two metres as they are on **ninety-six megacycles** or thereabouts.

If you want to have any contacts on two metres you will have to use telephony. The "Z" calls are on two metres because they did not sit for a morse examination, and the ex-low frequency phone stations haven't a key in the shack and forgot morse years ago! When you graduate to working two metre DX, you may use a morse key, but this will only be when you have a **big signal.**

F.m. is much cheaper to put in the transmitter than a.m. Strangely enough, these characters who spend weeks hunting for grid drive won't spend an hour or two putting a discriminator in their receivers so you will have to put up

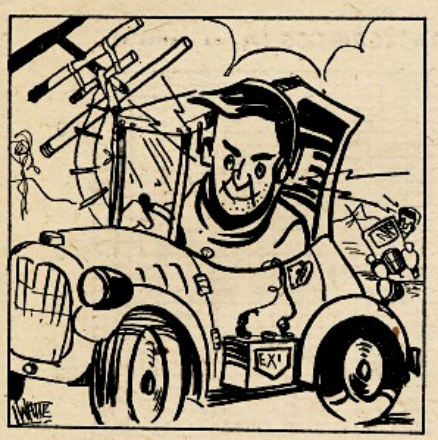
* "The Chalet," 2 Yerton Ave., Hunter's Hill, N.S.W.

with excruciatingly funny comments about your type of modulation.

Another approach is to use your 100 watt modulator from the low frequency transmitter and bore it into the 25 watt two metre rig. When you have fixed the **radio frequency feedback** you will have a nice wide signal with a few extra ones on each side. This helps to occupy the band.

For an aerial you will have a **beam.** It is conventional to use horizontal polarisation to stop your signals going over hills and down the other side. This diminishes the amount of interference. Horizontal polarisation also necessitates more ingenuity and trouble in mobile work and is therefore highly desirable. A simple beam is advisable at first; many complicated ones have been found to be only as effective as a dipole. If you are building a **tower** make sure that you have adequate space to accommodate it when it falls down in the wind.

You should really have some form of frequency measuring device—the minimum requirement is a set of **lecher lines** (the "h" is pronounced as a "k"), but between contacts you will have plenty of time to build a complicated heterodyne frequency meter. A phone monitor would be regarded with some suspicion and any tendency for this sort of thing to appear might start an evacuation to the one metre band. You will find that distortion, hum, splatter, parasitics, frequency drift and the like don't seem to cause much trouble on two metres.



". . . Fox Hunts are designed to encourage driving at high speed."

All is now ready. You call CQ and your first Sunday night on the band will bring a host of contacts—there is a **new signal on the band.** Please don't expect it to last; but your popularity will recur periodically during **Scrambles,** which are contests arranged so that you have an excuse to finish the contact quickly and get on with the next. This gets all your duty calls over in one night and you can then go back to nightly contacts with your personal friends.

Frequencies are subject to personal ownership on two metres and only the lowest megacycle is used. If your crystal lands on someone else's frequency and he has a **big signal,** you will need another **eight megacycle crystal.** If you have the **big signal** and he doesn't, then he will be looking for a new crystal. This is very convenient as you don't have to listen on **your own frequency** before you transmit.

Before long you will become entangled in a **technical discussion** type of contact. This consists of designing a new **portable transmitter** with fewer and smaller tubes to give greater output with less battery drain, or a new beam with an impossible number of elements. You must keep yourself well amused during the other fellow's over or you will go to sleep. To obviate this, a technique was invented called **cross band operation.** Here it is good manners to answer questions occasionally, even if you are busy with some intricate bit of soldering.

Field days using **portable** and **mobile equipment** were introduced by those living in **noisy locations** with **no domestic responsibilities.** A variety of this type of activity is the **fox hunt,** designed to encourage car driving at high speed; being booked is the equivalent of being thrown at a jump.

After you have made all your over-the-back-fence contacts you will be looking for **two metre DX.** This is the big test, but not of your equipment. Despite the permissible 100 watts, a beam of unbelievable gain, and a receiver with a fractional noise figure, you will **not** work DX if you have a bad location except once in a pink aurora. So you build an eighty metre transmitter and talk to the two metre DX stations on that band, or you learn morse, drop the "Z" (if you have one) from your call sign, and go hunting the real thing on twenty metres.

This is not, of course, the whole story. It would be absurd to suppose that anyone would build expensive and complicated equipment merely to have two or three contacts a week. When I have finished reading this book by Dale Carnegie I may have an odd moment in the social whirl of two metres to tell you more about this band.

— . . . —

PRACTICAL VACUUM TUBE VOLTMETER

(Continued from Page 9)

This offers the convenience of single probe operation where equipment is already earthed.

PUTTING THE V.T.V.M. TO USE

The uses of the V.T.V.M. are too numerous to list in detail, but the reader is assured that the time and effect put into the construction of such an instrument is well worth while. Typical jobs made easy are: Receiver alignment, using the d.c.v. ranges to read a.v.c. or diode load voltages; transmitter setting up, using the d.c.v. ranges to check grid voltage, thus checking grid drive without having to break the earth return of the grid leak and insert a meter; checking voltages in resistance coupled amplifiers; measuring the gain of amplifier stages by checking a.c. volts in against a.c. volts out.

These are just a few of the multitude of uses to which this instrument may be put. In fact, having built a V.T.V.M., the usual thing is that the constructor begins to wonder how he ever got along without one!

In conclusion, it must be mentioned that the instrument just described is not claimed to be superior to the de luxe V.T.V.M. described in the references, except in size and convenience. The large instrument has more ranges covering also d.c. milliamps. as well as having a very high input resistance. It is, as its name implies, a de luxe instrument. The present instrument is a practical every-day tool, easy to build, easy to get going and easy to use, designed to fill the same place as the well known multimeter, but with all the advantages possessed by a V.T.V.M.

For those wanting the very best in V.T.V.M's. and not worried by size or complexity, then the McMurdo Silver job would be the logical choice; the smaller version will, however, probably appeal to the majority of Amateurs.

REFERENCES

1 "Taming the Vacuum Tube Voltmeter," McMurdo Silver. Part 1, July, 1945, "QST"; Part 2, August, 1945, "QST".

2 "A De Luxe Vacuum Tube Voltmeter," J. C. Duncan, "Amateur Radio," January, March, 1950.

6146 Beam Power Amplifier Data

Cathode: Oxide coated. Indirectly heated.
Heater: Voltage (AC or DC) 6.3 volts ± 10%.
Current 1.25 amps ± 0.075 amp.
Maximum voltage between heater and cathode: 135 volts (DC).
Capacitances (without external shield; base pin No. 8 earthed):
Grid to Plate = 0.22 pF.
Grid to Cathode = 13.5 ± 2.4 pF.
Output = 8.5 ± 2.1 pF.
Useful Power Output: Minimum 47.5 watts.
Maximum Circuit Values (C.C.S. or I.C.A.S. conditions*)
Grid resistance equals maximum of 30,000 ohms.

When grid is driven positive and the 6146 is operated at maximum ratings, the total grid DC circuit resistance should not exceed the specified value of 30,000 ohms. If this value is insufficient to provide adequate bias, the additional required bias must be supplied by a cathode resistor or fixed supply. For operation at less than maximum ratings, the grid DC circuit resistance may be as high as 100,000 ohms.

* C.C.S.—Continuous Commercial Service.
I.C.A.S.—Intermittent Commercial and Amateur Service.

AF POWER AMPLIFIER AND MODULATOR CLASS AB1 AND AB2

MAXIMUM RATINGS, absolute values.

	Class AB1 Triode		Class AB1		Class AB2		
	C.C.S.	I.C.A.S.	C.C.S.	I.C.A.S.	C.C.S.	I.C.A.S.	
Anode voltage	400	400	600	750	600	750	volts
Screen voltage	connected to anode		250	250	250	250	volts
Anode current, max. signal	90	90	125	135	125	135	Ma.
Max. signal anode input (3)	35	35	60	85	62.5	90	watts
Max. signal screen input (3)	—	—	3	3	3	3	watts
Anode dissipation (3)	20	25	20	25	20	25	watts

TYPICAL OPERATION (Values are for two tubes)

Class AB1—Triode Connection

	C.C.S.	C.C.S.	I.C.A.S.	
Anode voltage	250	400	400	volts
Grid No. 1 voltage	—50	—100	—100	volts
Peak input between grids	100	200	200	volts
Anode current, zero signal	110	80	80	Ma.
Anode current, max. signal	144	136	136	Ma.
Effective load resistance, anode to anode	5000	8000	8000	ohms
Max. signal driving power	0	0	0	watts
Harmonic distortion	5	4.6	4.6	%
Output power (max. signal)	8	19	19	watts

Class AB1—Tetrode Connection

	C.C.S.	C.C.S.	C.C.S.	I.C.A.S.	I.C.A.S.	
Anode voltage	400	500	600	600	750	volts
Screen voltage (1)	190	180	190	200	200	volts
Grid No. 1 bias (2)	—40	—40	—45	—50	—50	volts
Peak input between grids	80	80	90	100	100	volts
Anode current, zero sig.	86	70	60	52	57	Ma.
Anode current, max. sig.	228	220	200	239	227	Ma.
Screen current, zero sig.	2	1.4	1	1.2	1	Ma.
Screen current, max. sig.	30	19.5	30.5	25.2	27.5	Ma.
Effective load resistance anode to anode	4000	5000	7500	5500	8000	ohms
Max. sig. driving power	0	0	0	0	0	watts
Harmonic distortion	8	8	8	7.5	5.7	%
Output power (max. signal	55	70	82	94	120	watts

Maximum Circuit Values for above conditions (see note 6):
Grid No. 1 circuit resistance, with fixed bias 0.1 megohm max.
With cathode bias (triode connection only): 0.5 megohm.
Cathode bias not recommended for tetrode connection.

(1) Preferably obtained from a separate source or from the anode voltage supply with a voltage divider.
(2) From fixed bias source.

Cap .... 3/8" dia.
Socket 5903/12/C
Bulb temperature, maximum of .... 220°C.
Mounting position .... any
Overall length, 3-11/16" ± 1/8"
Seated length 3-1/8" ± 1/8"
Maximum diameter 1-23/32"
Shipping weight .... 4 oz.
Net weight .... 3 oz.

Base .... Octal
Pin 1, Pin 4, Pin 6 } Cathode, Suppressor, and Internal Shield.
Pin 2, Pin 7 } Heater
Pin 3—Screen grid.
Pin 5—Grid.
Pin 8—Base sleeve.
Cap —Anode.

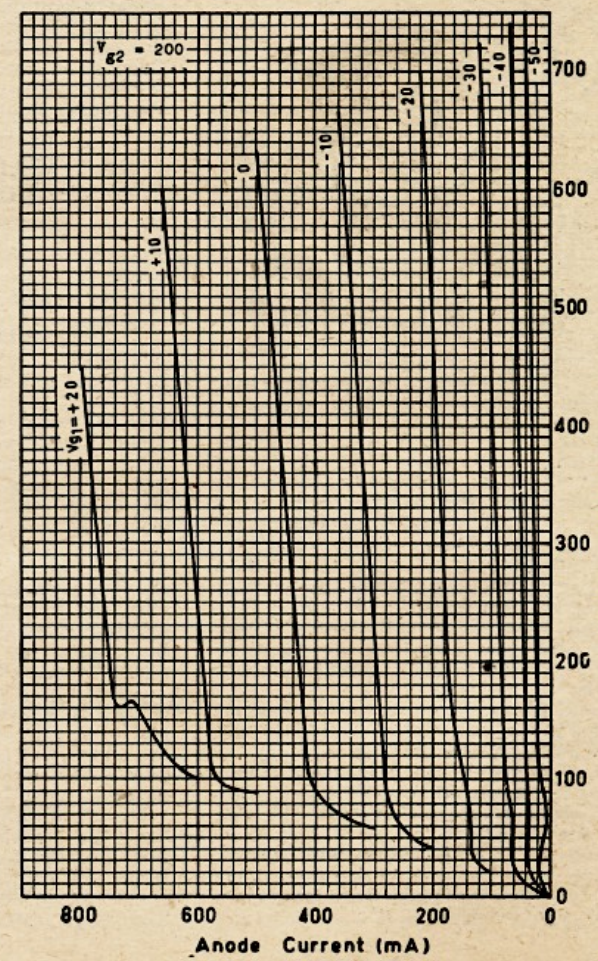
AF POWER AMPLIFIER AND MODULATOR CLASS AB2

MAXIMUM RATINGS, absolute values

	C.C.S.	I.C.A.S.	
Anode voltage, maximum	600	750	volts
Screen voltage, maximum	250	250	volts
Anode current, max. signal (3)	125	135	Ma.
Max. signal anode input (3)	62.5	90	watts
Max. signal screen input (3)	3	3	watts
Anode dissipation (3) max.	20	25	watts

PHILIPS

AVERAGE CHARACTERISTICS (V_{g_1} as variable)



11-11-1954

AF Power Amplifier and Modulator, Class AB2 (continued)

TYPICAL OPERATION (values are for two tubes)

	C.C.S.	C.C.S.	C.C.S.	I.C.A.S.	I.C.A.S.	
Anode voltage	400	500	600	600	750	volts
Screen voltage (1)	175	175	165	185	165	volts
Grid No. 1 bias (4)	—40	—40	—45	—50	—45	volts
Peak input between grids	86	87	99	113	101	volts
Anode current, zero sig.	63	64	31	41	35	Ma.
Anode current, max. sig.	232	242	207	270	240	Ma.
Screen current, zero sig.	1.5	1.2	0.7	0.9	0.6	Ma.
Screen current, max. sig.	28	26	31	29	21	Ma.
Max. grid current for max. signal	0.3	0.3	0.5	0.8	0.7	Ma.
Effective load resistance anode to anode	4000	5000	7500	5500	8000	ohms
Driving power on grids (5)	0.01	0.01	0.02	0.04	0.03	watts
Harmonic distortion	9.7	9.7	9.7	11	10	%
Maximum power output	60	81	90	115	130	watts

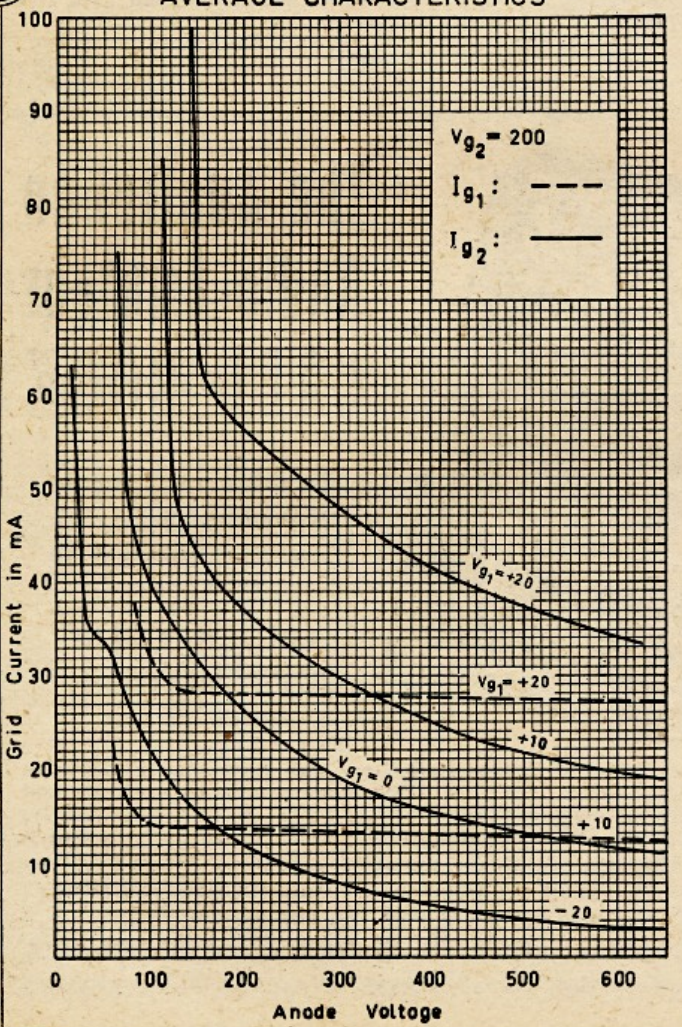
Maximum Circuit Values (see note 5):
Grid resistance with fixed bias: 30,000 ohms max. (cathode bias not recommended).

(3) Averaged over any audio frequency cycle of sine wave form.
(4) From fixed bias source.
(5) Driver stage should be capable of supplying the specified driving power at low distortion to the control grids of the AB2 stage. To minimise distortion, the effective resistance per control grid circuit of the AB2 stage should be held at a low value. For this purpose, the use of transformer coupling is recommended. In no case, however, should the total control grid DC circuit resistance exceed 30,000 ohms when the 6146 is operated at maximum ratings. For operation at less than maximum ratings, the DC circuit resistance may be as high as 100,000 ohms.

PHILIPS

6146

AVERAGE CHARACTERISTICS



ELECTRONIC TUBE DATA SHEET — ISSUED BY PHILIPS ELECTRICAL INDUSTRIES PTY. LTD., 69 CLARENCE STREET, SYDNEY, N.S.W. AUSTRALIA. BX 1661

11-11-1954

(6) The type of input coupling network used should not introduce too much control grid circuit resistance. Transformer or impedance coupling devices are recommended. When control grid is operated in the negative region with fixed bias, the control grid circuit resistance should not exceed 0.1 megohm. For higher values of this resistance, cathode bias is required. Under no circumstances should the total control grid circuit resistance exceed 0.5 megohm.

ANODE MODULATED RF POWER AMPLIFIER

Class C Telephony

Carrier conditions per tube for use with maximum modulation factor 1.0

MAXIMUM RATINGS, absolute values

	C.C.S.	I.C.A.S.	
Anode voltage	480	600	volts
Screen voltage	250	250	volts
Grid bias	—150	—150	volts
Anode current	117	125	Ma.
Grid current	3.5	4.0	Ma.
Anode input power	45	67.5	watts
Screen input power	2	2	watts
Anode dissipation	13.3	16.7	watts

TYPICAL OPERATION

	C.C.S.	C.C.S.	I.C.A.S.	
Anode voltage	400	475	600	volts
Screen voltage (7)	150	135	150	volts
Screen series resistor (7)	21500	26500	37500	ohms
Grid bias (8)	—85	—85	—85	volts
Grid resistor (8)	28300	28300	28300	ohms
Peak RF input	100	99	100	volts
Anode current	112	94	113	Ma.
Screen current	11.6	12.8	12	Ma.
Grid current (approx.)	3	3	3	Ma.
Driving power	0.3	0.3	0.3	watts
Output power	34	33	52	watts

Maximum Circuit Values: Maximum grid resistance: 30,000 ohms.

(7) Obtained preferably from a separate source modulated with the anode supply, or from the modulated anode supply through a series resistor.
(8) Obtained from grid resistance or from a combination of grid resistance and either fixed supply or cathode resistor.

RF POWER AMPLIFIER AND OSCILLATOR

Class C Telegraphy

Key down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the AF envelope does not exceed 115% of the carrier conditions.

Class C, FM Telephony

MAXIMUM RATINGS, absolute values

		C.C.S.	I.C.A.S.	
Anode voltage	max.	600	750	volts
Screen voltage	max.	250	250	volts
Grid bias	max.	—150	—150	volts
Anode current	max.	140	150	Ma.
Grid current	max.	3.5	4.0	Ma.
Anode input	max.	67.5	90	watts
Screen input	max.	3	3	watts
Anode dissipation	max.	20	25	watts

TYPICAL OPERATION AS AMPLIFIER

(at given maximum frequencies)

	Maximum Frequency up to 60 Mc.				Max. Freq. up to 175 Mc.		
Anode voltage	500	600	600	750	320	400	volts
Screen volt. (9)	170	150	180	160	180	200	volts
Screen series resistor (9)	29200	40200	28000	40100	15500	22200	ohms
Grid bias (10)	—85	—85	—85	—85	—54	—54	volts
Grid resistor (10)	28300	28300	28300	28300	30000	30000	ohms
Cathode res. (10)	570	670	510	620	360	335	ohms
Peak RF input	99	100	102	100	70	70	volts
Anode current	135	113	150	120	140	150	Ma.
Screen current	11.3	11.2	15	14.7	9	9	Ma.
Grid current	3	3	3	3	1.8	1.8	Ma.
Driving power	0.3	0.3	0.3	0.3	2	3	watts
Output power	50	52	69	69	25	35	watts

(9) Obtained preferably from a separate source, or from the anode supply voltage with a voltage divider, or through a series resistor. A series resistor in the screen grid circuit should be used only when the 6146 is used in a circuit which is not keyed. The screen voltage must not exceed 400 volts under key-down conditions.
(10) Obtained from fixed supply, by control grid resistor, by cathode resistor or by combination methods.

VICTORIAN ALL MODELS EXHIBITION

The All Models Exhibition and International Trade Fair will take place from **25th August** to **10th September** at the Exhibition Buildings, Melbourne. The exhibition on this occasion has been enlarged to take in the international side of things and it is anticipated that 250,000 people will pass through the turnstiles.

The Victorian Division of the Wireless Institute of Australia will again be taking the main stage as their exhibiting space and the organiser, 3LN, is most anxious to have the co-operation of Interstate Amateurs to maintain contacts during this exhibition.

VK3WI will be on the air simultaneously for the duration of the show on 2, 20, 40 and 80 metres and any contacts would be greatly appreciated.

Please remember that your side of the transmission will be relayed into the hall and please do not use abbreviations, but endeavour to make the transmission suitable in nature for audience participation.

VK3WI will be on the air each day excepting the Sundays from approximately 12 midday until 10 p.m. each night. Please make a note in the log of these times and dates, when your contacts with VK3WI will be greatly appreciated by the gang operating at the exhibition.

REMEMBRANCE DAY CONTEST

13th and 14th August

With the coming of August, members will recall that this month holds a date of particular significance to Australian Amateurs. Our Remembrance Day Contest is designed to honour the memory of our gallant comrades. By our participation, we render personal homage.

"At the going down of the sun
and in the morning,
We will remember them."

VARIATION OF AWARDS

The following variation of awards under Rule 17 will operate in the coming Remembrance Day Contest.

Instead of the three awards being given to first, second and third, in each State, these three awards will be given to the winners of the Phone, C.w. and Open Sections respectively.

It is felt that c.w. operators are at a disadvantage compared to those working phone or both phone and c.w. as they are so much in the minority and the change will encourage c.w. operators who would otherwise have little chance of gaining a certificate.

The full rules appeared in the July issue of "A.R."

120W. OF AUDIO WITHOUT DRIVING POWER

(Continued from Page 4)

cause of the heavier drain on the power supply, and appears practically entirely in the modulator output and not in the earlier stages. At this level the signal-to-hum ratio is over 30 db. With voice input and gain adjusted for full output on peaks, the drain on the supply is considerably less and hum is not observable.

With sine-wave input, the plate current at full output is 240 Ma. when the load is adjusted to the appropriate value for the plate voltage in use, as listed earlier. This maximum current is practically the same at all plate voltages listed, since the plate dissipation rating of the 6146 does not permit using a bias value that gives a very large value of no-signal plate current. The grid bias should be adjusted for a total plate current that represents a no-signal input of slightly under 50 watts at the particular plate voltage used.

The voltage gain from the microphone input to the modulator grids is such that full output can be secured with an input voltage of about 3 millivolts, r.m.s. This is of the order of one-tenth the voltage available from a crystal microphone with close talking.

— . . . —

LET'S BUILD A TOWER

(Continued from Page 5)

the four legs, temporary cross braces of 2" x 1" x 10' karri nailed to the legs on the ground and up the tower to their opposite partners above, and the gang who had now completely exhausted their excuses, assembled for the big day.

Eight Amateurs, one block and tackle, one cement mixer (the man next door) and one XYL, whose tea and cakes may have been an offering of gratitude for the removal of the obstruction to domestic traffic, congregated.

The cement mixer mixed cement, the boys heaved, pushed, pulled and swore; the XYL cheered and the tower was erected. Now, in place of a monster 42 ft. wide and 4 ft. high, was a landmark 42 ft. high and 4 ft. wide at the bottom, making a great difference in a backyard 45 ft. wide.

A catwalk was prefabricated from scrounged bedsteads and fitted near the top. The top bearing plate, six inches square by ⅜" thick, with convenient length of pipe welded through centre and iron legs 8 inches long of 1" x ⅜" welded to each corner at the correct angle, is bolted to the top of the tower legs.

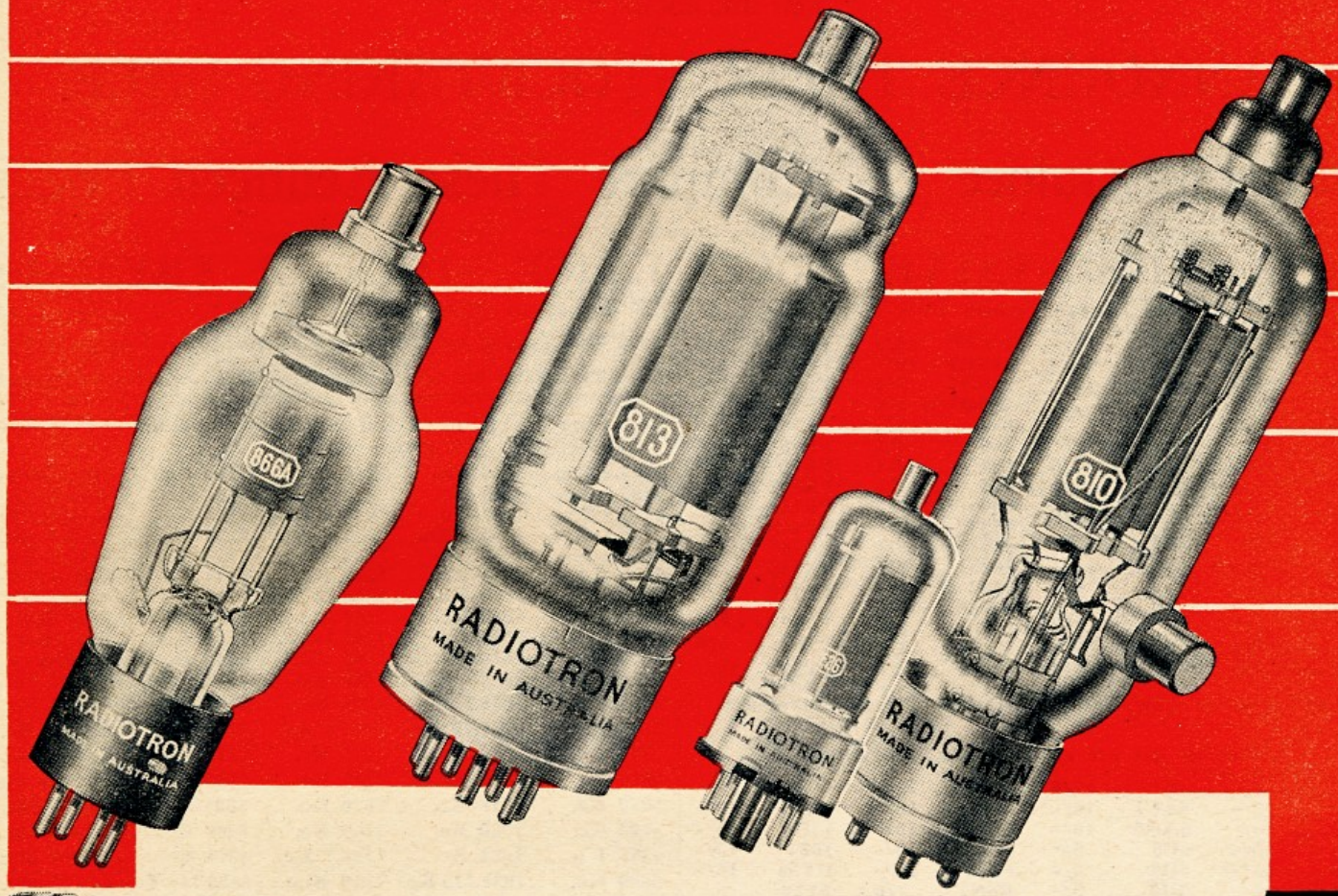
The beams used are a two element "ZL Special" for 14 Mc., two element "ZL Special" for 21 Mc., and a 4 element parasitic for 50 Mc.

Four stays were attached to the 30 ft. level as a safety measure and so far the tower, 200 yards from and overlooking the ocean, has withstood gales of up to 80 m.p.h.

Further details of construction, etc., can be supplied on request to anyone interested in the erection of a similar structure.

If someone else builds it and then has a change of QTH, the writer would like to know how it was taken down. Hi!!

RADIOTRON POWER VALVES



Today's high standards of radio performance are dependant upon the use of first quality components.

Radiotron valves are manufactured to exacting standards which ensure you of the ultimate in performance at all times.

Be sure of the quality and consistency of your signals by using Radiotron Power Valves.

Important: When ordering valves, be sure to mention "Amateur Radio" so that priority can be given to your order.

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Bargains Galore - - Compare These Reduced Prices

NOTE THESE VALVE PRICES

Look at these Bargain Priced NEW VALVES—

1A5	2/6	6N7	10/-	12SJ7	10/-	VR21	2/6
1B5	2/6	6N8	15/-	12SK7	10/-	VR22	2/6
1K4	5/-	6Q7G	5/-	12SQ7	2/6	VR32	2/6
3Q5	5/-	6R7G	10/-	12SQ7GT	2/6	VR35	2/6
5V4	10/-	6SC7	10/-	816	15/-	VR38	2/6
6AG7	15/-	6SJ7GT	12/6	866	£1	VR66	2/6
6B8	15/-	6SK7GT	12/6	834	£1	VR75	15/-
6C8	7/6	6SS7	12/6	884	£1	VR99	5/-
6F5	7/6	7A4	5/-	954	10/-	VR102	5/-
6F6	10/-	7A6	5/-	955	10/-	VR103	5/-
6K6	7/6	7B8	5/-	957	10/-	VR105	15/-
6K7	10/-	7C7	2/6	1625	£1	VR122	2/6
6K7G	7/6	7E6	5/-	5763	25/-	VR150	15/-
6L7	10/-	7W7	5/-	EF50	10/-	VT50	2/6
6L7G	7/6			U10	2/6	VT51	2/6
				VR18	2/6	VT52	10/-
				VR19	2/6		

Full stocks of New Valves available. Prices on request.

Following list are ex Disposals, guaranteed—

1K5	5/-	5U4	12/6	6J5GT	10/-	6V6	10/-
1K7	5/-	6AC7	10/-	6SA7	10/-	12A6	10/-
1L4	5/-	6AG5	10/-	6SJ7	10/-	12K8	10/-
1S5	10/-	6C6	5/-	6SK7G	10/-	1625	15/-
2X2	10/-	6D6	5/-	6SL7	15/-	CV92	15/-
3A4	5/-	6H6	5/-	6SN7	7/6	EF50	5/-

Bendix RA1B Power Supplies, 240 volt AC, 24v. at 1 amp. output 250v. HT ..... £5 each

Genemotor Power Supply, SCR522, 24v. input, 150v. and 300v. output at 300 Ma. Includes relay, voltage regulator, etc. A gift at £1. Too heavy for postage.

2.5v. or 4v. Filament Transformers ..... 15/- each

Chokes, 15 Henry, 100 Ma. ..... 10/- each

Chokes, 15 Henry 175 Ma. ..... 20/- each

2 uF. 1000v. block type Chanex Condensers 12/6

Relays, A.W.A. Aerial Change-over type, 12v. 15/-

English Carbon Mike Transformers, new 5/-

Locktal Sockets ..... 1/6 each

Valve Sockets, ceramic, 8-pin Octal 2/6

LARGE STOCK OF CRYSTALS

100 Kc. R.C.A. Crystals £4

1000 Kc. Crystals, DC11 holder, with two pig-tail connect., 35/-

Gold Plated Marker and Commercial Crystals, price on request. Delivery in seven days.

Following is a list of Crystal Frequencies available for immediate delivery. £2 each—

2081.2 Kc.	5456 Kc.	7024 Kc.	7120 Kc.	8161.538 Kc.
2103.1 Kc.	5530 Kc.	7025 Kc.	7121 Kc.	8171.25 Kc.
2112.5 Kc.	5700 Kc.	7028 Kc.	7125 Kc.	8176.923 Kc.
2208.1 Kc.	5892.5 Kc.	7032.6 Kc.	7126 Kc.	8182.5 Kc.
2218.7 Kc.	6350 Kc.	7035 Kc.	7130 Kc.	8183.5 Kc.
2595 Kc.	6375 Kc.	7040 Kc.	7134 Kc.	8188.889 Kc.
3062.5 Kc.	6450 Kc.	7042.65 Kc.	7140 Kc.	8317.2 Kc.
3086.5 Kc.	6850 Kc.	7050 Kc.	7145 Kc.	8320 Kc.
3382.5 Kc.	7005 Kc.	7053.5 Kc.	7150 Kc.	9125 Kc.
3500 Kc.	7010 Kc.	7064 Kc.	7156 Kc.	10 Mc.
3511.2 Kc.	7010.7 Kc.	7068 Kc.	7162.5 Kc.	10.511 Mc.
3515 Kc.	7011.5 Kc.	7072 Kc.	7163 Kc.	10.515 Mc.
3516 Kc.	7011.75 Kc.	7073.5 Kc.	7174 Kc.	10.524 Mc.
3825 Kc.	7012 Kc.	7075 Kc.	7175 Kc.	10.530 Mc.
5000 Kc.	7016 Kc.	7077 Kc.	7725 Kc.	10.5465 Mc.
5050 Kc.	7018 Kc.	7080 Kc.	8007.69 Kc.	10.556 Mc.
5300 Kc.	7020 Kc.	7100 Kc.	8009 Kc.	12.915 Mc.
5335 Kc.	7021 Kc.	7106.7 Kc.	8014 Kc.	14.020 Mc.
5360 Kc.	7021.715 Kc.	7110 Kc.	8155.714 Kc.	14.322 Mc.

MORE BARGAINS ON INSIDE FRONT COVER!

Simulator Sets. Contains two meters 0-20v. and 0-5 Ma., 2 in. square type. Two VR65, one VR135 valves, one vernier dial, Genemotor 11-12v. input, output 480v. at 40 Ma. (conservative rating) and lots of resistors, condensers, etc. £5 each

American Metering Kit containing one 0-10 Ma. and one 2 Ma. Meter, 2 inch round. Complete with cords and plugs, £2

Inter-Com. Units, English. Contains two valves, transformers, P.M.G. key switch, resistors, etc. To clear ..... 12/6 each

Shielded Cable with two 12-pin Plugs 7/6

Five-core Cable, not shielded ..... 8d. yard

Co-ax Connectors, Ampenol type, male and female .... 7/6 pair

Co-ax Connectors, male/female, small Pi type, new, 2/6 pair

Co-ax, indoor type, cotton covered ..... 1/- yard

Co-ax Cable, any length, 50 ohms ..... 1/9 yard

5A MELVILLE STREET, HAWTHORN, VICTORIA

North Balwyn Tram Passes Corner, near Vogue Theatre. **Phone: WA 6465**

Money Orders and Postal Notes payable North Hawthorn P.O. Packing Charge on all goods over 10 lbs. in weight, 5/- extra.

WANTED TO BUY—RADIO PARTS, VALVES, TRANSFORMERS, RECEIVERS, TRANSMITTERS, ETC.

Amateur Radioteletype

67 West 44th Street,
New York 36, N.Y., U.S.A.

Editor "A.R.,"
Dear Sir,

FOR some years I have been diligently scrutinising the various Amateur Radio journals of our overseas friends in the hope of some day finding that interest had been aroused in a form of Amateur Radio communication which has made considerable progress in the United States.

I am referring to Amateur Radioteletype operation; the use of mechanised telegraph printers to permit accurate and high-speed transmission of messages in the manner so nearly universally employed by the commercial radio companies.

Here in the U.S.A. the radio-printer group has grown from a single station in 1946 to well over 2,300 at the end of 1954. In addition, there are about 50 Canadian stations now transmitting via this means. A very few overseas stations have participated which means that little or no DX operation is occurring outside of continental North America. This is to be regretted inasmuch as Amateurs have always prided themselves on their ability to keep abreast of, if not outstrip, their commercial brothers.

R.t.t.y. offers real benefits to the Radio Amateur. In the emergencies wherein Radio Amateurs the world over have so often contributed to the security of life and property, teleprinter operation enables an extremely large volume of message traffic to be handled in a minimum of time, with a maximum of accuracy, and by relatively unskilled operators.

Since most wire-line communication companies and agencies have converted almost exclusively from morse hand-keyed transmission to code-operated printing telegraph equipment, it will be realised with what effectiveness an r.t.t.y. Amateur could provide a radio link for an emergency-breached wire line circuit.

I have had the good fortune of being the first Amateur to use radioteletype-writers via f.s.k. (frequency-shift-keying) on our bands. I was very shortly joined by several score of New York City Amateurs on the 2 mx v.h.f. band. Very shortly thereafter Amateurs pioneered the first transcontinental U.S.A. printing telegraph hook-up. Following that was the setting up of a circuit to Japan for the handling of free messages from the American soldiers stationed there to their families in the States.

After considerable campaigning Governmental regulations were altered to permit r.t.t.y. on all bands, hitherto only available to c.w.-keyed circuits. This relaxation of restrictions against the employment of f.s.k. on the DX bands is what prompted the writing of this letter. Similar action on the part of overseas governments would make International radioprinter communication a common occurrence.

Co-operation is had with our Civil Defence, Red Cross, Telegraph Companies and the Signal Divisions of our Military Forces for participation with them in the event of a National Emergency. The Army, Air Force and Navy have provided radioprinters in the stations they permit to be operated, on Amateur bands, by Amateurs among their members.

Since 1946 the r.t.t.y. Amateurs throughout the U.S.A. and Canada have had as their National organisation the V.h.f. Teletype Society with headquarters at 38-06 61st Street, Woodside 77, N.Y., U.S.A. Despite the name, the Society is not restricted to v.h.f. but is the headquarters organisation for all r.t.t.y. Amateurs. The Society furnishes constructional blueprints, technical bulletin, maintains departments for aiding new members and publishes a National publication.

The most important service performed by the Society is the obtaining of very serviceable, although superseded, printing telegraph equipment for its members through contacts with all the major wire companies. This equipment, which new would cost over $1,000 in most cases, is available to the Society's members for about the cost of bookkeeping to the telegraph companies. Equipment is secured as inexpensively as $15 and not over about $100 as a maximum. Originally many new machines were obtained from Military surplus disposals although this source has practically disappeared at the present time.

It should be mentioned at this point that advantage is taken of the unique ability of f.s.k. receiving converters to eliminate or minimise radio noise, fading and QRM, to set up automatic "repeater" networks (most have been on v.h.f.). A repeater picks up an incoming signal, "washes" out the QRN, QRM, QSB, etc., and operates a polarised telegraph relay. The contacts of this relay now provides an "ideal" signal, not only for keying the local teleprinter, but for keying a "brand-new" outgoing f.s.k. signal.

Copy is faultless and errorless on signals so weak and full of noise that, were it hand-keyed, using make-break c.w. instead of f.s.k., copy would be impossible. F.s.k. is startling in this respect. Frequency shift has the added advantage that, like f.m., interference with television and radio is minimised or eliminated since the carrier amplitude is unchanging. Key clicks are non-existent.

Most attempts to get overseas Amateurs interested in r.t.t.y. have met with the stumbling block of the availability of equipment. While it is possible that the V.h.f. Teletype Society could arrange to get equipment shipped to foreign points, it would appear much better to attempt to tap sources of equipment closer to home. Communications agencies and companies, if properly approached, are generally pleased to have an outlet for their superseded machines at prices above that for scrap metal, when they have assurances that the equipment will not be utilised in competitive services.

Individuals stand little chance of obtaining the release of this sort of apparatus, but they will generally co-operate with duly authorised representatives of a National group. One of their objections to dealing with individuals is the large volume of correspondence involved in individual, piecemeal, sales. A National group can handle the release of hundreds of machines with a single letter.

Surplus Military disposals may be a good source in which to secure printers.

In closing this lengthy, but earnest, communication, I would like to offer my assistance to any overseas Amateur having bona-fide interest in printing telegraph operation. I have been the Secretary of the V.h.f. Teletype Society National organisation for the past eight years and have seen it grow up to several thousand enthusiastic members through the spirit of co-operation that exists all over the world among Amateurs. It is my sincere hope that International r.t.t.y. operation will become as much a reality as our extensive operations in this country.

Fraternally,
JOHN EVANS WILLIAMS, W2BFD,
Technical Editor "CQ."

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UM2	60	120	200 Ma.	11	8
UM3	120	240	250 Ma.	14	8

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UM2	5¼" x 4¼" x 5¼"	**£9/17/3**
UM3	5¼" x 5¼" x 5¼"	**£12/2/6**

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BEAM POWER AMPLIFIER VALVES

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£3/10/-

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Phone—0.3w. drive for 52w. out!

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TYPE Z956-1—Inductance 30 Hen. max., 20 Hen. min. at full rated DC of 200 Ma. DC resistance 160 ohms, DC working voltage 1,000 volts. **£3** plus Sales Tax.

TYPE Z969-1—Inductance 25 Hen. max., 15 Hen. min. at full rated DC of 80 Ma. DC resistance 500 ohms, DC working voltage 1,000 volts. **35/-** plus Sales Tax.

TYPE Z986-1—Inductance 15 Hen. max., 10 Hen. min. at full rated DC of 300 Ma. DC resistance 60 ohms, DC working voltage 1,000 volts. Ideal for low loss filter in mercury vapour or high vacuum rectifier full wave power supply. **£3/10/-** plus Sales Tax.

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TYPE OT-790—Primary Z: 12,000 ohms tapped 8,000 ohms; Secondary Z: 500 ohm line. Handle 14 watts audio conservatively. Suit PP 6V6s Class AB1. Ideal for remote Modulator for low power modulation, low power Public Address Amplifier, etc. **59/6** plus Sales Tax.

TYPE OT-796-1—Primary Z: 6,600 ohms CT, tapped at 3,800 ohms; Secondary Z: 250, 167, 125, 100 ohms. Match PP 807 Class AB1 to low Z line. Ideal for Modulator use up to 18 watts conservatively rated. **80/-** plus Sales Tax.

TYPE OT-797-1—Primary Z: 3,800 ohms CT, tapped at 3,200 ohms; Secondary Z: 250, 167, 125, 100, 83 ohms. Match PP 807s Class AB2 to low Z line. Rated for 55 watts. Ideal for Modulator Transformer. **£5** plus Sales Tax.

CONDENSERS

A.W.A. Type "H" Two Gang Variable. **15/-** plus Sales Tax.

DIODES

Type OA50 and **Type OA56**. These diodes have similar characteristics to the 1N34/A. **8/6** plus Sales Tax.

"SMITH" ELECTRIC PRE-SET CLOCK

For suitable circuitry, read the July issue of "RADIO & HOBBIES" describing a "Clock Radio."

Can also be used for delayed operation of Amateur equipment, alarm system or any electric switching function.

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FIFTY MEGACYCLES AND ABOVE

NEW SOUTH WALES

On Sunday evening, 12th June, at 7.30 p.m. the usual v.h.f. broadcast was given by 2OA. At the conclusion he announced that a Surprise Scramble was to be held on 2 mx from the time the announcement finished until 9 p.m. The Scramble was on, and at 9 o'clock 25 stations were reported as having taken part. The honours went to John 2ANF who made 23 contacts, Adrian 2HE was second with 19 contacts, and 2CE, 2AJZ and 2YM shared third place, 18 contacts. The results and the idea were heartily commended by all.

The Group had planned a Fox Hunt for Sunday, 16th June, and although the day was not started or finished as planned, the Fox Hunt was held and enjoyed by all who took part. 2AJZ was to have been the fox, but owing to a break-down, he was unable to go on the air at the time scheduled. He made haste to the shack of 2XX and using Ted's gear informed the hounds what had happened. After a conference the hunt was reorganised with 2ANF as the fox, who was given a short time to get on his way and the hounds were soon in full chase, but was not caught until he had gone to earth in the Dural district. Points towards winning the chase were allotted for miles covered and for time taken; so, as 2HL was first in, and 2OA covered the shortest distance, the score was a draw. John, "the fox," then decided the best thing to do was to hold a short run so as the two super sniffers could settle the argument. So they were off, and after a short but sharp run the fox was caught, and would you believe it, that the winner was 2LG who showed them both up! Unfortunately the feud continues.

The V.h.f. Sunday Broadcast is now being done on a roster system and the stations in order are: 2HO, 2APQ, 2AJZ, 2OA, 2HL and 2QZ. We hope that there will be no split infinities.

The monthly meeting of the Group took place on the first Friday of the month at the usual meeting place, the Leichardt-Petersham Technical College. Business for the evening was quickly dealt with, so that our lecturer, Norm Beard, 2ALJ, of the staff of the College, could continue his lecture of the previous month on "Television." Norm gave us a thorough run through of a commercial t.v. rx. The rx was on display with a pattern generator, also a signal generator with which to cause interference. Much knowledge was gained by all present and many members (50 present) counted the number of tubes in the rx with missgiving—22 plus the picture tube. At the conclusion of the lecture a vote of thanks was proposed by 2HE, and as usual was passed with acclamation. During the evening, Adrian informed the Group as to the action and the results obtained so far in his work as official keeper of N.S.W. v.h.f. long distance contacts records.

The management committee of the Group met at the home of 2APQ's on 5th July and apart from the business dealt with, a supper of no mean proportion, prepared by Mrs. and Miss Healey, was also very successfully dealt with. During the evening the committee arranged the following fixtures: 7th August—Field day, the actual form of same to be advised later. On 21st August a 2 mx Scramble will be held between the hours of 8 and 10 p.m., and on the 31st August a night Hidden Tx Hunt. Other subjects were discussed and will be reported at the next meeting of the Group on Friday, 5h August.—2AJZ.

VICTORIA

At the last Fox Hunt it was the hounds who played the tricks. While 3IE kept the fox crew entertained with light conversation, 3VZ and Jim Shaw put identifying "L" for Len marks in flourescent tape on the front and back bumper bars and flourescent paint on the sides of the fox car. At the first hiding place in a sports oval in Hawthorn, the first to track the Fox down was 3KD, followed by 3VZ, 3ALY, 3ZAY, 3ZAA and 3YS. Then around the streets in Glen Iris 3ZAM, 3VZ, 3KD and 3ALY all caught the Fox while he was on the run. The next hiding spot was in a paddock near Alamein where 3ADU was first, followed by 3KD, 3ZAY, 3ALY and 3ZAM. After leaving this spot the Fox was again run down whilst on the run by 3VZ, 3KD, 3ALY, 3ZAA and 3ZAY. The final location was held at the home of Clem 3GY at Burwood. Thirty-three participated in supper and the post-mortem on the evening's run. We wish to thank Clem and Joy for their friendly hospitality in making their home available for the gang to finish off the evening. Bob 3OJ acted as control station and was ably assisted by Ron 3ZBH with cross bearings. Many thanks Bob and Ron.

We hope to have two new starters at the next Fox Hunt in Tom 3AOG and Roy 3ARY. Tom's tx has two 12AT7s, a 6J6 final, modulated by a 6C4 and a 6AQ5; intends building a xtal locked converter into his car radio with a 6 el. beam attached to his car. Roy 3ARY has a xtal locked converter into a Command rx and a three el. beam. Berry 3APB is building a new 2 mx mobile—12AT7, 5763 and 2E26, also a new beam for the home location, a 5 over 5, approx. 15 feet high.

At the V.h.f. meeting, Max 3ZAW gave an interesting description of his 2 mx gear which he had brought along. It consisted of a converter placed in the genemotor space behind the 6 to 9 Mc. Command rx. Alf 3IE brought in an interesting set of figures and tables which he had compiled. It almost proved that within the metropolitan area, DX working ability was directly proportional to the elevation of the station.

Considerable time was spent in discussing the V.h.f. Group's exhibit at the forthcoming Models Exhibition and Bob 3OJ was appointed to act on the main committee for the V.h.f. Group.

Laurie 3ALY has recently moved indoors to a new shack. The tx is a 6J6 xtal controlled and tripler to 24 Mc., 6J6 doubler and tripler, QVO4/7 driving an 832; his beam is a 5 over 5, and the rx is a three tube 6J6 push pull converter into another 3-tube converter on 7 Mc., then into a BC433G at 1,500 Kc.

Max 3BQ has made contact with 2AJO at Coolamon on phone and has worked Bram 5ZAB at Naracoorte since the erection of Bram's new 30 el. 2 mx beam, 100 ft. high. 3JX, of Hamilton, has worked 3PG cross-band 80 mx; hopes to have 2 mx converter going son. 3TA, at Horsham, reports hearing a number of Melbourne stations on 2 mx; tx will be in operation shortly.

Don't forget to look for the chaps in Gippsland, active at present are 3ZD at Warragul, 3TH at Yinnar, 3TO at Yallourn and 3DI at Leongatha. A new one in Gippsland is 3ZAB at Traralgon with an SCR522 on 144.14 Mc. 3AKE is active on 2 mx from Geelong. Tony 3ZAZ at Glenthompson is operating on 144.46 Mc. and using 8w. into a dipole; has worked 3AKR and 3AGD and is frequently on the band. Another new Z call, Glen 3ZBJ, is now active on the 2 m xband.

3ZBH and 3AHL have their gear ready to operate on 288 Mc. They will be on the air each evening from 1830 hours and will make contacts on 144 Mc. first.

50 Mc. news. Who requires Northern Territory for 6 mx W.A.S.? 5TL, of Alice Springs, is building gear for 6 mx and hopes to be on by the time it opens up again.—3LN.

SOUTH AUSTRALIA

50 Mc.: There is very little activity on this band, the only stations to be heard are Ken 5KC, Col 5RO and your scribe. The future of 50 Mc. and later 56 Mc. is very uncertain, the proposed change from 50 to 56 Mc., and secondly, t.v.i., being the main deterrents to any activity. This band is very prone to t.v.i. as many Ws have found out. However, one compensating factor is that during the summer months we will be able to watch the Interstate television, i.e. if the transmissions are around the 50 Mc. band.

144 Mc.: This band is undoubtedly "the v.h.f. band." The possibilities for experimenting and long distance ground wave communication are very great, there being much to do that hasn't been done before in the way of rx and antenna design. Stations operating on this band are 5AV, 5HD (Bill does not get on very much these days due to pressure of work), Ian 5ZAA, Neil 5ZAW with a much improved signal, Neil had a very unusual fault in his tx—too much grid drive of all things! Others operating include 5RO, 5KC, 5LE and 5RI.

Last month your scribe journeyed by car to Whyalla and Port Lincoln complete with 2 mx converter and 3 el. Yagi beam. At a prearranged time sigs were heard from Col 5RO, using 10w. input to a 522 and 3 el. beam. His sigs were R3-R5 with signal strength peaking on S4-S5. The use of c.w. would have made copy a solid R5. Signals were also heard from 5MT's tx using 100w. input and a 12 el. beam. Signal level at Whyalla varied from S6-S9 on peaks, the distance being approx. 150 miles.

On 19th of last month your scribe exchanged RST numbers on 144 Mc. with Trev 3ATR in Warracknabeal, sigs both ways S2-S5 with the usual QSB. On the same night your scribe also copied Ray 3ATN, but his signal was well down below Trev's in level. At 2150 hours S.A.S.T. the same night, Trev copied 5MT's phone on 144 Mc. for a period of 2 minutes.

The following night, Monday, 20th, 5MT's sigs were again heard by Ray and Trev, however they were much weaker than the previous night. No more tests took place until Sunday, 27th, and once again Trev identified my 2 mx sigs, but they were extremely weak. It does appear from the above results that a signal can be heard just about every try over this difficult 270 odd mile path.—5MT.

WESTERN AUSTRALIA

Despite lack of publicity, the attendance at the newly formed V.h.f. Group has steadily risen and about 20 people attended the June meeting held at Rollo's home. Welcome visitors were Bill 6DX from Kalgoorlie and Don 6DW from Bruce Rock. Sid 6SJ was our lecturer and gave a very interesting talk on transistors and demonstrated a transistor set built by him. Ralph 6ZAD passed around his new converter which is very similar to the r.f. end of the D.M.E. rx, 6AK5/6J6 cascode, 6AK5 pentode, 6AK5 mixer. The thanks of members goes to Rollo and Mrs. 6BO for their hospitality.

144 Mc.: Quite a co-operative effort is being made to increase the mobile activity on this band. Len 6ZAT is building a tx using a QQCO4-15 tripler in the final, Don 6ZAK is building the rx and Ron 6ZAR is providing the antenna and the car. Just whose call sign will you use boys?

The distances being worked in the Eastern States should provide food for thought for any country Amateur who is thinking of coming on 2 mx. The present lack of any active country stations is not encouraging for anyone to improve their gear. Any country Amateur who would like information and even a portable expedition to his QTH should contact any of the v.h.f. gang in Perth!

Rollo 6BO has just completed his receiving station for Adelaide air radio on 133 Mc. approx. When he hears Adelaide then 2 mx may be open! Don't scoff! He has worked into Adelaide on two occasions!

The V.h.f. Scramble will have taken place when this appears in print and I wonder how many people will be building more selective rx's. Jim 6RU, always a contest man, has already sharpened up his 522 in preparation!

288 Mc.: This is the band of activity. 6ZAV's new converter mentioned in last month's notes has been working very well and Don has now commenced a xtal controlled tx using 832s as a tripler from 96 Mc. and as a final. Don was able to provide Stan 6ZAS with his first contact on this band. Stan is using a mod. osc. and a super-regen. rx. Denis 6AW has a xtal controlled 832 tripler-final using 2w. and was able to work Don 6ZAV. Tests with Wally 6ZAA were unsuccessful. The 6BO/6ZAA contact has still not taken place despite the addition of a grounded grid p.p. r.f. amplifier to the latter's converter.

6ZAA is building a xtal controlled tx using 12AT7s for mobile use and this should create additional interest. Murray 6ZAM, Lionel 6ZAE and Cecil 6ZAZ, who have promised activity on 288 Mc., have still to appear. Lionel and Murray, at the top of the Darling Scarp (1,000 ft. and overlooking Perth), should work some fine distances!—6ZAA.

BOOK REVIEW

NEW ZEALAND AMATEUR CALL BOOK

Published by N.Z. Association of Radio Transmitters.

The book contains a complete list of all New Zealand Amateur Stations and also lists overseas members and non-transmitting members. Further sections include Hints on Operating Procedure, Amateur Frequency Allocations, W.W.V. Schedule, N.Z.A.R.T. Standard Frequency Transmissions, Official DX C.C. Countries List, Country Prefixes and a list of N.Z.A.R.T. Contests and Overseas Awards not all of which are given in detail, it being necessary to refer to various issues of "Break In" for full particulars.

Copies are obtainable from the New Zealand Association of Radio Transmitters, Box 970, Dunedin, N.Z., and the price is 2/6 (New Zealand) plus 2d. (N.Z.) postage, approximately 3/4 Australian.

AMATEUR CALL SIGNS

FOR MONTH OF MAY, 1955

NEW CALL SIGNS

VK—

New South Wales

2PG—J. H. Gore, 12 Pearl St., Newtown.
2PY—K. A. Kimberley, 214 Wardell Rd., Dulwich Hill.
2AOP—E. Pearce, 19 Meehan Gardens, Narrabundah, Canberra, A.C.T.
2ATR—D. S. Robertson, 29 Carrington St., Deakin, Canberra, A.C.T.
2AUD—K. E. McDonald, 5 Lombard St., Balgowlah.
2ZBG—R. S. Graham, 764 Canterbury Rd., Belmore, Sydney.

Victoria

3FR—G. L. F. Smith, 43 Alexandra St., Montmorency.
3MT—Royal Melbourne Technical College, 124 Latrobe St., Melbourne.
3OH—A. Holst, 10 Flintoft Ave., Toorak.
3AAR—L. H. Ross, Hughes St., Upwey.
3AFC—F. Clark, 164 Middleborough Rd., Blackburn.
3ANK—N. A. Town, "Weald Cottage," Leith Rd., Montrose.
3AXW—V. G. Wyatt, 38 Queen St., Cobram.
3ZAT—D. D. Tanner, C/o. A. J. Savage, Scoresby Rd., Bayswater.
3ZBI—I. R. Woodman, 24 Fewster Rd., Hampton, S.7.
3ZBQ—B. W. Heinze, Liverpool Rd., Kilsyth.

Queensland

4CY—H. R. Greber, Station: 6 Miles N.N.W. of Yeppoon; Postal: P.O. Box Yeppoon.
4IA—B. F. Darragh, Willis Island.
4ZAW—G. Whitehead, 4 Biarra St., Yeerongpilly, Brisbane.

South Australia

5DV—D. B. Vaughton, 149 Burbridge Rd., Brooklyn Park.
5TM—R. D. Martin, House 20, Radium Hill.
5TS—Metro Radio Club, Simpson's Buildings, Gawler Place.
5ZAJ—J. A. Gibbs, 209 Hutt St., Adelaide .

Tasmania

7XD—K. W. Nutt, Station: Roseville Guest House, 11 Bedford St., New Town, Hobart; Postal: C/o. Hydro Electric Commission, P.O. Box 631B, Hobart.
7ZAT—K. A. Thomson, 126 Bowen Rd., Lutana, Hobart.

CHANGES OF ADDRESS

VK—

New South Wales

2BV—Waverley Radio Club, 47 Meymott St., Randwick.
2DM—D. W. McDonald, 5 Union St., Newcastle.
2EA—L. Martin, 104 Dobie St., Grafton.
2IY—T. H. Cahill, 11 Creedon St., Railwaytown, Broken Hill.
2JH—J. V. Hutchison, 17 Lambert Rd., Bardwell Park.
2LI—M. P. Moore, 35 Towner Gardens, Pagewood.
2LK—B. T. Turner, 46 Hassell St., Westmead.
2ON—R. L. Douglas (Dr.), 5 Mason's Pde., Gosford.
2SQ—W. J. Weller, 56 Buckingham St., Canley Vale.
2WQ—R. T. Wilkins, 11 Thomas St., S. Grafton.
2AEQ—N. S. King, 43 Bent St., Nth. Sydney.
2ARH—R. R. Howe, 13 Arana Rd., Mona Vale.
2AYG—P. Gresser, Lot 30, Maxwell St., Balgownie.

Victoria

3LU—M. Muller, St. Leonards Rd., Healesville.
3MP—S. V. Hosken, 69 Mason St., Hawthorn, E.2.
3OY—W. D. Iliffe, 85 Warrigal Rd., Oakleigh, S.E.12.
3QM—B. I. Learmonth, C/o. Mrs. Hiscock, Frederick's Lane, Portland.
3SN—G. P. Lee, Station: 139 Madden Ave., Mildura; Postal: Box 539, Mildura.
3AAM—A. H. Sengotta, 16 Hawthorn Ave., Caulfield, S.E.7.
3AFF—L. B. Fisher, 11 Erskine Ave., Cheltenham, S.22.
3AGE—M. G. Esam, 7 Nankivell St., Colac.
3ALJ—G. L. Moore, 3 Wheatland Rd., Malvern, S.E.4.
3AMO—M. S. Lang, 69 Bayview Cres., Black Rock.
3AWQ—W. Reilly, 39 White St., Wangaratta.

Queensland

4GD—L. H. Dodds, 24 Townsville St., West End, Townsville.
4GL—J. F. Langford, Gundiah, N.C. Line.
4LM—L. E. H. Mallinson, 14 Hill St., Valley, Brisbane.
4RJ—R. J. R. Delbridge (Rev.), 16 Grove St., Toowong, Brisbane.

South Australia

5DZ—J. A. Casey, C/o. Station 5CK, Crystal Brook.
5FN—R. J. Poole, 37 Stanley Ave., Blair Athol, Prospect.

Tasmania

7AB—D. H. Fisher, 17 Pickard St., Lenah Valley, Hobart.
7RY—F. E. Nicholls, 22 Haig St., New Town.

Territories

9EB—K. S. Mullan, C/o. Crowley Airways, Lae, N.G.

CANCELLED CALL SIGNS

VK—
2ND—K. W. Nutt. Now VK7XD*.
2AXZ—K. A. Kimberley. Now VK2PY*.
2ZAP—E. Pearce. Now VK2AOP*.
3MT—Melbourne Technical College. Change of Name*.
3AQJ—K. E. McDonald. Now VK2AUD*.
3ZAF—F. Clark. Now VK3AFC*.
3ZAT—N. A. Town. Now VK3ANK*.
5FL—R. C. Harris.
5HO—C. L. R. Bullock.
5TS—Dept. of Civil Aviation. Change of Name*.
5XO—A. W. Kelly.
5ZAM—R. D. Martin. Now VK5TM*.
7MR—D. M. Richardson.
1PG—J. H. Gore. Now VK2PG*.
* See New Call Signs.

ROSS HULL V.H.F. CONTEST

Owing to an oversight, VK5JO was omitted from the list of VK5s in the official results published last month. Herewith are the South Australian scores:

VK5MK	1620 Pts.
VK5QR	1205 Pts.
VK5JO	729 Pts.
VK5AX	307 Pts.
VK5ZL	264 Pts.

DX ACTIVITY BY VK3AHH†

PROPAGATION REPORT

3.5 Mc.: Break-throughs to **North** and **South America** and the **Far East** occurred around 0700-1400z when stations there were active.

7 Mc.: Fair to good conditions existed during the month. Long-path (0500-0800z) and short-path conditions (1900-2300z) to **Europe** were noticed. The **American continents**, the **Pacific Islands** and the **Far East** were workable between 0600z and 1300z, with long-path conditions to the North American East Coast around 2100-0000z.

14 Mc.: A marked improvement of conditions on this band can now be reported. No definite times can be mentioned for **Europe** and **North America** as both continents were workable from about 1800z to 1200z. **Central America** and **Africa** appeared around 0200-1100z.

21 Mc.: Here more or less steady conditions to **North America** and break-throughs from **Africa** have been reported.

27/28 Mc.: North American signals continued to appear around 0200-0300z.

NEWS AND NOTES

The best news for a long time: Well known DXer **Bob Ford, ex-AC4RF**, has been released and is now back in the free part of this planet, anticipating operation as VS6. (From W6YY and ZL1CI).

ZC2PJ (Cocos Island) will return to Ceylon in August, but hopes to arrange for another ZC2 to come on thereafter. (from W6YY.)

VS4CT should now be active from Sarawak and remain there until September-October. (From 3YS and W6YY, S.C.DXC.)

The good, old **80 mx band** has again been of major interest to DXers specialising in DX on that band. Recently, the appearance of **CE4AD** (3506 Kc.) and his contacts with VKs 2QL and 5KO caused a lot of excitement. Also, 4S7DJ, ZD2DCP, EL2X, TI2PZ and ZC4JA have been or expect to be active, and KL7 stations are looking for VKs on 80 mx phone. (From 5RI, ZL1CI, N.C.DXC.)

A DXpedition to the Carribean area —by Ws 6OXS and 6VUP—did not operate from PJ2-St. Martin Island, but is supposed to be active from British Virginia Island (Leeward Islands). (From 3HT, 4YP and W6YY.)

Operators at **VS1GK** come from VK land. (From 2AQJ.)

VR6AC is reported to be on 14,143 noon, VK time). (From W6YY and S.C.DXC.)

By courtesy of the Northern California DX Club, here are the times for this year's International DX Contest: Phone: 22nd Oct. 0200z to 24th Oct. 0200z; C.w.: 29th Oct. 0200z to 31st Oct. 0200z. Rules are the same as before although this year total all-band top scorers and top scorers on each single band in each VK licensing area are eligible for certicates. However, no certificates will be issued to any contestant operating less than five hours or having less than fifty contacts.

This year's Macquarie Island team recently showed up on 7 Mc. (From 3AJK, 3ALQ).

VR3B is another Amateur on **Fanning Island**. (From 3CX.)

KT1EXO is ex-TI2EXO (from 2QL).

XW8AB is active from **Laos** (from 3JA).

† Hans J. Albrecht, 10 Belgravia Ave., Box Hill North, E.12, Vic.
* Call signs and prefixes worked.
z — zero time—G.M.T.

This month the S.w.l. Group of the Vic. Div. W.I.A. can look back upon one year's existence. During the year the activities of the Group have been very successful. Also, W.I.A. L numbers are now being issued and a Victorian S.w.l. QSL Bureau has commenced operation (Manager: Ian J. Hunt, 9 Malua St., Ormond, S.E.14). Congrats boys and best wishes for the years to come!

DXers and Listeners everywhere! Please do not forget the list of b.c. stations in our exclusive band 7.0 to 7.1 Mc., published in "A.R." 7/55! Send your report and help to keep 7 Mc. clean!

QTHs OF INTEREST

(From 5WO, BERS195, N.C.DXC., S.C.DXC.)
AP2C—P.E.M.E., Cannaught Lines, Quetta, Pakistan.
VQ3FN—Louis Staalberg, C/o. Williamson Diamonds Ltd., P.O. Mwadui, Tanganyika.
XZ2SY—P.O. Box 833, Rangoon, Burma.
ST2DB—P. O. Box 516, Khartoum.
EA6AR—Dr. Miguel Bordoy, Pont-y-Vich 14, Ralma, Balearic Islands.
HR3HH—Hal Holler, C/o. Standard Fruit Co., Coyoles, Honduras.
BV1US—M.A.A.G. Formosa, A.P.O. 63, P.M., San Francisco, Calif., U.S.A.
VS4CT—Via VS2 Bureau.
JZ0PS—Box 52, Hollaradio, Dutch New Guinea.
VR6AC—Floyd H. McCoy, Pitcairn Island, South Pacific Ocean.
Ex-VP6LH—VR2AM, Les Hammett, Suva, Fiji.
KG1AA—931 Squadron, A.P.O. 23, C/o. P.M., New York City, N.Y., U.S.A.
KG1FR—2004th A.A.C.S. Squadron, A.P.O. 121, C/o. P.M., New York City, N.Y., U.S.A.

ACTIVITIES

3.5 Mc.: Frank **2QL** heads the list with **CE4AD***, **W6***, **W7***, **VE7***, and **JA1CR**. Neville **2APL** adds **W3***. Bud **2AQJ** reports Ws, while Steve **3ASS** heard JAs and Ws on phone. Here at **3AHH** the log shows **W9*** and **W6, KL7HJ.**

7 Mc.: 2QL heard **HR1JZ**. Laurie **2AMB** reports **HK5BY***, **VE7***, **KP4RE***, **FK8AB***, **G2HLF***, **YJ1AA** on c.w. and **HP3FL***, **Ws*** on phone. **2AQJ** QSOed **FK8AO*** and heard JAs, DU. Ivor **3XB** adds **HR1JZ*** and **CO7ANG***. Jack **3AJK** worked **VK1DC*** on phone. Don **3ALQ** spoke to **HP3FL***, **Ws*** and **VK1ZM***. Roy **9AU** also phoned with **Ws***. **Dave Jenkin** heard **HR1JZ, VE3,** and **DU7SV.** '**Norman Clarke** reports a number of Ws on phone.

14 Mc. C.w.: 2QL: KT1EXO*, **K6JDU/VO6*** and **OX3AY, ZC2PJ, ZD6BX, EA8BP. 2AMB: VK9BW***. **2APL: YV5BJ***, **FK8AJ***. **2AQJ: JA***, **FK8AH***, **KL7PI/KL7***, **VS1GK***, **VR2AA***. Alan **3CX: YN1AA***, **VR3A***, **VP9BM***. Neil **3HG: EA3***, **EA9BC***, **VE7***, **ZS1***, **XE1***, **Gs***. Jack **3JA: ZS1CK***, **ZS2BC***, **DL***, **YU***, **EA3***, **VP9CE***, **ZC2PJ***, **CR7CO***, **KG1AA***, **4X4FQ***, **I***, **PJ2AR***, **ZD6BX***, **ZM6AX***, **GI5UR***, **OH***, **SM***, **FK8AH***, **FK8AC***, **FA8BG***, **KJ6KW***, **VR2AR***, **OE7FW***, **OE13USA***, **ON***, **Gs*** and **XW8AB.** Ken **3KR: EA3***, **HB1PQ***, and **VQ8CB, VQ6LQ.** Bill **3TX: YJ1DL***, **Europeans. 3XB: ZM6AB***, **DL***. Bob **4RW: KZ5BR***, **EA3***, **YU***, **YN1PM***, **XE1MJ***. John **5HI: DL.** Ray **5RK: JAs***, **VE7***. Austin **5WO: G***, **ZS6UO***, **ZS5JT***, **9AU: KL7***, **VS6***, **FM7WP***, **VE6***, **VE7***, **VE8***, **OH***, **CO2SW***, **G***, **XE2MB***, **KP4***, **YN1AA***, **YV5AE***. **Dave Jenkins: JAs, ZM6AS, VP6KL, YV5BZ, TI2AB, CT1, CR2BZ, KP4DH, HB9, VE7, FK8AC, CR2AR, EA3, I, VE6, JZ0AG, SM, KP4ZC, YJ1DL.**

14 Mc. Phone: 2APL: ZS. 3JA: ZS6QW*, **ZS5JN***, **ZS4GK***, **ZS2DT***, **ZS1CG***, **ZS6AJC***, **ZS6FN***, **DL***, **XE3L***, **XE2KW***, **XE2HZ***, **XE1CM***, **KL7AV***, **KL7BDK***, **KL7BDD***, **KL7FAP***, **W4BKS/KL7***, **KL7ADR***, **KL7ML***. **3TX: 5A4***, **YV, CO2. Rex 3UR: VP9G***. **4RW: FM7WQ***, **ZM6AT***, **TG9AI***, **TG9MB***, **KZ5FA***, **VE5***, **YS1MS***, **ZD3BFC***, **KC6ZB***, **KA0IJ***. **5HI: VE5***, **TG9MB***, **TG9KF***, **TI7RAC***, **I***, **TI7JH***, **4S7YL***, **VP9BN***, **CO3JL***, **CO2OS***, **XE2FC***, **DL***, **TG9AC, YV5AB***, **ZS6ABY***, **ZS6CY***, **ZC6ZK***, **XE2HZ***, **KL7AIZ***, **XE1DU***, **YS1MS***, **HE1OP***, **VR2CW***. **5WO: KG4AP***, **TG9RV***, **YV5FK***, **TI2BX***, **CO2BK***, **CO2CY***, **5A4TK***, **XE1MJ***, **EA9AZ***, **5A4TX***, **I***, **TI2JS***, **HC2ER***, **XE1RE***, **ZS6FN***, **ZS1SW***, **VQ5FK***, **ZS6XL***, **ZS5MP***, **ZS6ADB***, **ZS5JM***, **EI2W***, **BV1US***. **9AU: ZC5SS***. **Jim Hunt: ET2AB, ET2US, ZS5, ZS6, CN8, YS1, CX2, LU6, LU7, LU1, CE2, PY4, PY1, TG9, CO2, CO1, CO3, XE2, XE1, XE3, TI2, VP9, YV5, HC1, EA3, PA0, Gs, ON, DL, SM, F, I, OD5, HZ1, 4X4, HB9, EI9, OE3, 9S4, GW, SV0, VS6, VS4, VS2, ZM6, VR2, KV4, DU7, XZ2, C3, VU2, AC3PT, DU6, KC6, KL7, VE3, VE4, VE6, VE7. Dave Jenkin: CO2CY. Norman Clarke: VR2, XE1, VE5, VE4, CO2.**

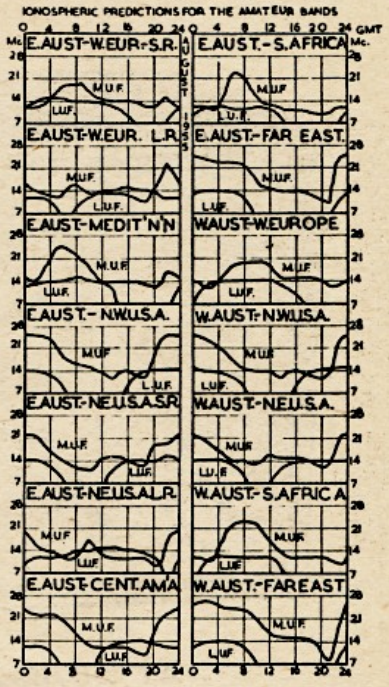
21 Mc.: 2QL: VQ4RF. Reg 3GX: Ws. Bert 8HE: Ws and ZSs. 3ZU: Ws. 3AEP: Ws. Jim Hunt: Ws, W/MMs, KA2, KA8, KG6, KH6s, VK9, VS6, DU7, 4S7, VS2, TI2, KZ5, XE1, HC1, G3, DL6, HB9.

27/28 Mc.: Frank **3ZU** heard **W6, W0, KH6,** and **Jim Hunt** adds **VK9BS.**

Rare QSLs were received by: 2QL: PJ2AQ, KC4AB, PJ2AA, CR7LU, LU0DEL, LU1ZB, KP4CC (3.5 Mc.), **VQ4EG. 2AMB** (all for 7 Mc. contacts): **KZ5BE, KZ5MN, VS2CR, LU6WD, DL1FF. 3JA: ZC2PJ. 5HI: VQ8CB, PJ2AJ, GC6FQ, VQ4EG. 5RK: VQ4BNU. 5WO: HR3HH. XE, 1MJ, BV1US, 4S7SS, VK1EG, ST2DB, 4X4FV, ET2MZ, XZ2SY, LU3FAQ. BERS195: AP2C, EA6AW, FA3OA, I1BNU/Trieste, TI2PZ, VQ3FN, ZC4IP, KZ5FA. 3AHH: PJ2AQ, VQ4EG** (7 Mc.), **CT3AB.**

Thanks to **W6YY, ZL1CI,** the Northern and Southern California DX Clubs, and **VKs 2QL, 2AMB, 2APL, 2AQJ, 3CX, 3GX, 3HE, 3HG, 3HT, 3JA, 3KR, 3TX, 3UR, 3XB, 3YS, 3ZU, 3AEP, 3AJK, 3ALQ, 3ASS, 4RW, 4YP, 5HI, 5RI, 5RKK, 5WO, 9AU,** and **s.w.l's. BERS195, Jim Hunt, Dave Jenkins** and **Norman Clarke.**

PREDICTION CHART FOR AUG., 1955



DOES YOUR WILLIAMSON ANNOY YOUR DOG?

IS YOUR CLASS B AMPLIFIER LINEAR?
ARE YOUR 'SCOPE AMPLIFIERS FLAT?
DOES YOUR VENTED ENCLOSURE BOOM?
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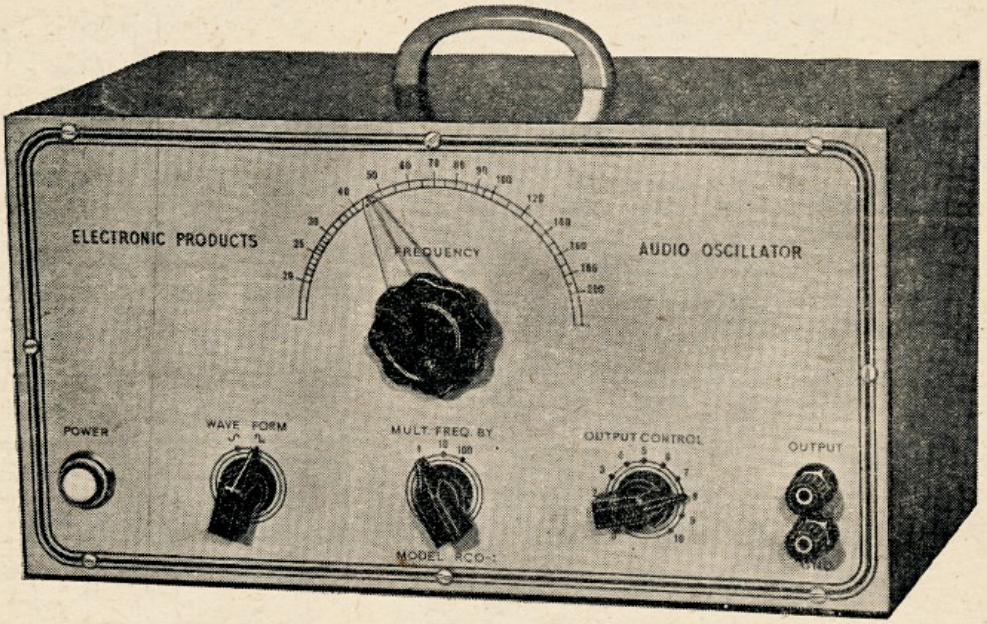

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FEDERAL, QSL, and DIVISIONAL NOTES

FEDERAL

FREQUENCY CHANGE

In view of the change from 50-54 Mc. to 56-60 Mc. (the first of the v.h.f. bands) at the beginning of 1956, it has been felt a period of time for adjustment would be very advantageous for operators as well as allowing an uninterrupted period for the Ross Hull Contest.

Following approaches to the Amateur Administration, permission has been granted by the Authorities for—

The 56-60 Mc. band to become available as from the **1st November, 1955**, and operation to cease on the 50-54 Mc. frequency on **31st January, 1956.**

This concession will allow Amateurs some chance of comparing the bands and yet maintain continuity of operation while signals can be heard.

FEDERAL COUNCILLOR FOR VK2

Federal Executive notes with regret that Jim Corbin, VK2YC, has found it necessary to relinquish the post of Federal Councillor in VK2. In spite of his many and varied duties, Jim has given full attention to items on a Federal level and has kept Executive posted with matters relating to the New South Wales Division.

The important post of Federal Councillor has been assumed by Bill Lewis, VK2YB. Knowing Bill's enthusiasm and activities in the Institute, it can be said with confidence that, in him, VK2 has found a worthy successor.

RADIO CLUB BOLIVIANO

An applicant for membership of the I.A.R.U. is the Radio Club of Bolivia.

The Radio Club Boliviano is the national Amateur Society for that country. It has a total membership of 131, with 89 licensed. There is a total of 69 Amateur Stations in the country and the official address of the society is Plaza Venezuela No. 21, P.O.B. 2111, La Paz, Bolivia.

— . . . —

FED. CONTEST COMMITTEE

NOTES ON CONDUCT OF REMEMBRANCE DAY CONTEST, 1955

These notes and suggestions are published as an aid to the contestants and the checking committee and all entrants are requested to follow them as far as possible.

The rules for 1955 are unchanged, but a rule specifying calling and logging procedure for contestants using a station other than their own has been added. The calling procedure specified has the approval of the P.M.G. Dept. and should indicate to all stations that a different operator is on the job and that a further contact with that call sign is valid.

Interpretation of rules. The committee has authorised the following interpretation of specific rules for the purpose of checking logs:

Rule 16: Logs not received by the Contest Committee by the due date will be disallowed except those from VK9 posted before the due date and logs from VK1 transmitted by radio.

Rule 19: Scoring Logs will be those having a minimum of five **valid** contacts according to rule 11, etc.

Rules 11 and 14: A **valid** contact will have the call sign and cipher sent by the station worked, **completely correct.** It will be assumed for checking purposes that the station sending the cipher will have it correctly recorded.

Rule 11: Logs with serial numbers commencing at over 100 or numbers not in sequence will be disallowed, except where it appears that a genuine error has been made in the sequence.

General: Where doubt xists, the contact will be allowed. All checking will be done in the spirit of the contest.

Operating. Checking last year showed that there were a considerable number of what appears to be clerical errors in the logs submitted. As an aid to reducing these errors, the following suggestions are made.

If you use a rough log for the contest, use sheets ruled up in a similar manner to the proper log; it is easier to transcribe if all columns are in the same order. If there are 30 lines to the page, omissions or duplications should become apparent.

Write legibly and ensure that the cipher you give is correctly recorded on your log. The figures you show as having given are used to check what the other fellow shows as having received.

Acknowledge cipher received and wait for an acknowledgment of cipher given, because if a cipher is missing from either log a complete exchange of numbers has not been made and both contestants lose that contact. Ensure that the band of operation is correctly recorded each time you change bands.

Logs. Where possible use the standard log sheet, if this is not possible, use **quarto** paper ruled in a similar manner to the standard log and with 30 lines.

Have 30 contacts on each sheet with the serial numbers in correct sequence. It is a distinct help in checking if it is known that contact No. 167 appears two-thirds the way down on the sixth sheet—all contacts for checking are located by the serial number sent.

Make your log legible; checking is done at night and after several hours "hard to read" letters and figures **are hard to read.** If typed use double spacing; if written use ink not pencil. Do not use faulty ball point pens. Do not submit a separate log for phone and c.w.

Awards. Logs will be eligible for awards as follows: OPEN—Logs of contestants showing scoring contacts by both phone and c.w.; PHONE—Logs of contestants showing scoring contacts by only phone; C.W.—Logs of contestants showing scoring contacts by only c.w.

General. In the 1954 Contest, 19 logs were disallowed for breaches of rules 11, 16 and 19, so—

1. Ensure that your serial numbers are correct.
2. Ensure that your log is sent to **your Divisional Secretary** for membership certification in time to be forwarded to the committee before the due date.
3. If you are getting only the minimum number of contacts to qualify get two or three extra to ensure that you have five **valid** contacts.

Good hunting fellows, and may the R.D. Contest 1955 be the best ever.

CALL SIGNS

Attention of members is again drawn to the habit of omitting the prefix "VK' when announcing call signs. This is particularly noticeable in the case of phone operation.

Such practice is not in accordance with International requirements and contravenes the Wireless Telegraphy Act. Operators should be careful that they use the full call sign allotted to the station concerned.

FEDERAL AWARDS

W.A.V.K.C.A.

One application received during the month from Mr. C. H. Jackson, 541 Thorn Ave., Palm City, California. Mr. Jackson gained the certificate under the call sign KH6PY where he was stationed during 1948-9 on active duty with the U.S. Navy. His current call sign is W6GBG and he is now trying to earn another W.A.V.K. C.A. Award from his present location. Certificate number three is being issued to Mr. Jackson.

DIVISIONAL AWARDS

From correspondence received during the month I have gleaned information to the effect that there are what appears to be Divisional Awards in existence, i.e. other than the Ross Hull, Contest Committee Awards, etc. Since questions are being asked and cards are coming to hand, it would be appreciated if Divisions would advise me of any awards in existence in their areas. Advice of this nature will place me in the picture and I can then answer the queries which come to hand.

—Gordon Weynton, VK3XU, Manager.

VICTORIA

This month I've decided that there will be no notes in the usual sense of the word. Other interests kept me away from the June meeting, and as nobody supplied any gen on the meeting there will be no write up. The Tx Hunt and country areas will be covered in the usual manner. Anyhow, in my humble opinion, too much space is devoted to notes! (Pause here and wipe away the tears shed by the VK5 scribe.)

For this month I propose a new line of attack. The Federal QSL Bureau, The Contest Committee and sundry other departments are getting space each month to report on their activities, but the Mag Committee never seems to get a say. Well, the VK3 Division supplies the manpower for this committee, so the VK3 notes space is, for this month, given free, gratis and for nicks to them. Heaven help the compilation department if THESE notes are blue pencilled.

There should be no need to list the members of this committee as their names appear on page 1 for everybody to see, but the actual work they do may not be appreciated. One night each month, generally the coldest or wettest, the committee meets to discuss all matters pertaining to the mag. Anybody leaving the meeting before midnight is a piker, and runs the risk of not being wished a Merry Xmas by the editor. The main thought behind all meetings is to give the readers of "A.R." as much as is humanly possible for their money without sending the magazine bankrupt. At the same time we have to endeavour to obtain the largest circulation possible and cater for all tastes, be they v.h.f., h.f., constructional or theory, s.w.l's. or active Amateurs.

Your committee feels that more often than not, the balance of technical articles to notes and advertising has not been the best, but we have done our best with the limited number of articles available. The remedy is in our readers' hands. We rely on them for material to publish. Don't think because your article takes four or five months to see print that we have more than we can publish. If an article is straight forward, does not require any drawings, or only one or two that are small and simple, there is every chance of it being published within two months. If, on the other hand, a large number of drawings or a complicated circuit diagram is required, the understaffed technical department, all of whom work in their own time, and are forever racing the clock in an endeavour to make the deadline, must take longer to prepare your article for publishing.

Talking of deadlines, there is a growing tendency for various scribes to be late with their material. The deadline is the 8th of each month, and unless this date is adhered to it is impossible to have the type set, the printer's proofs checked, and the mag. out on time. The alternative—late notes not published. What can you do to help?

No doubt we ourselves are open to criticism, so let me have a say first. We have big plans to improve the magazine. We want to see more pages and a better class paper. Above all, we desire to publish a few photographs

This programme is more ambitious than it looks in cold print, and will take quite some time to fulfill, but with your support we will do it.

We particularly appeal to the s.w.l's. for articles of interest to their groups—and we mean articles, not notes. We look to them to supply the Amateurs of the future, and in their ranks there must be many with the ability to describe equipment they have built which could have a wide appeal not only to their groups, but to active Amateurs as well.

I started out with the intention of outlining some of the activities of the Magazine Committee, but so far have only touched on a few matters we have discussed and which, I felt, should be aired publicly. Now space has caught up with me and the original intention will have to be shelved till another scarcity of notes evenuates, or the Editor comes and humbly asks that this matter be continued. In the meantime, if there is anybody with drawing ability prepared to help us, even if only for a few months, please come forward. The salary? Same as we pay 5PS!!

September Meeting.—At the meeting to be held on 3rd August an announcement will be made concerning the September meeting. The position is that the Radio Theatre will not be

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MIC 36

Housed in attractive plastic case, this Microphone is ideal for home recording and public address, etc. Response unexcelled for its size and price. The performance is not affected by vibration, shock or low frequency wind noise. Omni-directional frequency response substantially flat from 30 to 7000 c.p.s. Recommended load resistance not less than 1 megohm dependent on low frequency response. Can be supplied complete with switch and floor stand adaptor as required at a small extra cost.

£6/18/6

HIGH QUALITY MICROPHONE

MIC 16

Designed to meet even the most exacting requirements, this Microphone incorporates the world famous floating crystal sound cell construction. Its special characteristics are that its fine performance is not affected by vibration or shock. The fidelity is not impaired by low frequency wind noise.

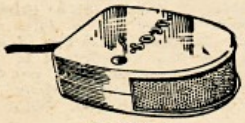
SPECIFICATION

Recommended load resistance—not less than 1 megohm.
Output level —65 db ref. 1 volt/dyne/cm².
Frequency response—substantially flat from 30 c.p.s. to 10,000 c.p.s.
Directivity—non-directional.
Size—2⅛" spherical diameter.
Connector—Standard international 3-pin.

£24/19/6

GENERAL PURPOSE MICROPHONE

MIC 35



The MIC 35, undoubtedly the best value ever offered, is ideal for amateur transmitters, public address, etc. Housed in an attractive die-cast case, it features a high sensitivity and substantially flat characteristics. Provided with a built-in shunt resistance of 2 megohms, it will, when connected to the grid of the input valve, give a substantially flat response from 50 to 5000 c.p.s.

£2/15/-

SPECIFICATION

Output level: —55 db ref. 1 volt/dyne/cm².
Cable—approx. 4 ft. of co-axial supplied.
Weight—6 ozs. unpacked, 7 ozs. packed.
Dimensions—microphone only 2¼" x 2⅛" x ⅞"

TABLE AND STAND MICROPHONE

MIC 22

This omni-directional Microphone is robust in construction, with a pleasing appearance. Vibration, shock or low frequency wind noise will not affect the performance. The low frequency cut-off is dependent on the load resistance. The cut-off is given by the quotation, F = 80 ÷ R, where F = c.p.s., R = megohms. An adaptor (floor mounting) is available at low extra cost.

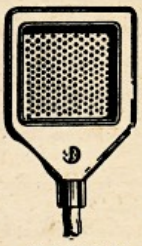
SPECIFICATION

Output level = —50 db ref. 1 volt/dyne/cm².
Output impedance—equivalent to approximately 0.002 uF. (0.8 megohm at 100 cycles).
Frequency response—substantially flat from 40 to 6000 c.p.s.
Recommended load resistance—not less than 1 megohm, dependent on low frequency response.

£9/18/6

LAPEL MICROPHONE

MIC 28



Designed to give freedom of movement, this Microphone is small and non-directional. Housed in a soft moulded rubber case, which gives protection against shock, it is provided with a pin at the rear of the case for pinning to the lapel.

£5/19/6

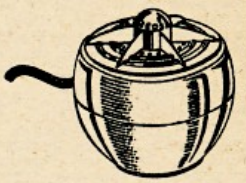
SPECIFICATION

Output level—approx. —55 db ref. 1 volt/dyne/cm².
Recommended load resistance—5 megohms.
Frequency response—level throughout the whole of the audible spectrum.
Capacity—0.0015 uF. at 1000 c.p.s.
Impedance—100,000 ohms at 1000 c.p.s.
Cord—6 ft. shielded cable.
Size—1-9/16" wide x 2¼" long x ⅜" thick.

HAND OR DESK MICROPHONE

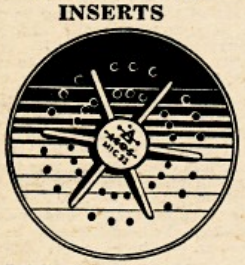
MIC 33

This Microphone has been designed for the high quality public address and home recording field. High sensitivity and flat characteristics are obtained by a specially designed acoustic filter. Housed in an attractive plastic case with an unexcelled response for its size and price. Unaffected by vibration, shock or low frequency wind noise. Omni-directional frequency response substantially flat from 30 to 7000 c.p.s.



£6/18/6

MICROPHONE INSERTS



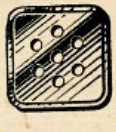
(MIC 32 illustrated)

CRYSTAL MICROPHONE INSERTS

These inserts are available in varying sizes ranging from as small as 15/16" square to 1-13/16" round, with various thicknesses from 7/32" to 9/16". Suitable for every purpose such as hearing aids, public address, tape recording, amateur broadcasting, etc., they have responses from 2250 c.p.s. to 3500 c.p.s. at 5 db to 30 db. Insert can be supplied with or without 10 meg. resistor as required.

MIC 32 insert, **£2/15/6**; all others, **£1/19/6**.

MICROPHONE INSERTS



(MIC 23 illustrated)

EXCLUSIVE AGENTS: **AMPLION (A'SIA) PTY. LTD.** SYDNEY, AUSTRALIA

available for the meeting scheduled for 31st August. This may be an opportunity for a visit of inspection and further information will be broadcast by VK3WI.

80 METRE TRANSMITTER HUNT

Although the weather was rather chilly, 29 of the gang attended the hunt. Reg 3ZAD, who hid the tx, was assisted by Barry 3JB. The signal received at the start was so strong that the competitors felt that the tx must be hidden in one of the gum trees on the plantation at the assembly point, however the reason for the excellent signal was soon realised when the competitors arrived on the location.

Reg and Barry had hidden it at the foot of the partly constructed new vertical radiator of one of the commercial installations at Rosanna. They used the tower, which is 150 ft. high mounted on huge insulators, as a vertical antenna. The location was a dream one, way up on top of a very high hill overlooking very picturesque country in all directions. Len 3LN was the winner.

EASTERN ZONE CONVENTION AT MAFFRA

The gang gathered at Keith Scott's (3SS) on Saturday, 11th June, and later 25 sat down to a nice three course dinner at R.S.L. Club Rooms. After the usual toasts, the tables were cleared and the Convention gathered near one of the fires to proceed with plans for the next twelve months. YLs and XYLs gathered at another fire and held a knitting convention.

We missed the pleasure of the company of several regulars this year who just couldn't make it. Bill 3WE couldn't get away from Omeo, Lindsay 3IO, with a new daughter, had to stay and help at home, and we missed the 2 mx boys from Leongatha also Ron 3PR, who had to drop out through sickness of his parent; likewise Alan Jacka with a son unwell.

State President, Gordon Dennis, and his XYL were welcomed heartily, likewise Keith 3HK and Jeff 3YJ. David Tanner, whose home is near Maffra, was welcomed as a visitor from Melbourne and as another new Amateur. Gilbert McFarlane, living near Sale and awaiting his call sign, was welcomed, and this year we welcomed 3AAV and 3AJK as new members in the zone.

Zone officers are—President: Bert Budge; Vice-Presidents: Alan Jacka and Jack Sparks; Secretary, David Scott; Treas. and Zone Organiser: Graham Colley; Official Zone Stations: Ian Dunnicliffe, assisted by 3PR, 3QZ, and 3TH; Notes Correspondent: Keith Scott, assistants Ron Jardine and Jack Sparks; Emergency Liaison Officer: Keith Scott.

The usual good resolutions were passed, namely, more activity on 2 mx ("look out Leongatha, here we come") and more portable activity. We feel inclined to adopt a spot frequency for the zone, possibly 144.18 Mc., which several zone stations are already using. It is proposed to start a radio club in the Latrobe Valley, so all those interested in this worthy project are urged to keep in touch with 3BB, 3AAV and 3AJK and lend their support to the movement. Pay up your dues boys, because Gordon Dennis showed us a long list of lovely disposals that will be announced very soon. After the business session, we screened some Kodachrome pictures taken by Keith Heitsch in Tasmania, and a few by Keith Scott of past Conventions, etc. Then a good supper was served and at 12.30 a.m. the gathering broke. Some of the more enthusiastic members went home with Ossie Kellas to Tinamba where it seems he was assisted to evacuate some 807s, said function lasting till 4 a.m.

On Sunday a group inspected the Maffra Milk Products Factory, then had a poultry dinner at the local and afterwards journey to Glenmaggie Wier where photography and ear bashing were the order of the day. After a good typical Eastern Zone feed, the boys broke off about 5 p.m., voting the Convention a "good show." Next Convention is to be held at Morwell in June, 1956.

Leo 3ALS is on 6 months' long service leave. Have a good time Leo, but let's hear more from you when you return. The zone congratulates Col Gibson on his engagement. Best of luck Col! Zone members, we want to hear you on the zone net, 2,000 hours 3650 Kc. every Sunday. We are after the Kinnear Trophy this year, so let's get more active.

SOUTH WESTERN ZONE

John 3AGD, at Dunkeld, is keeping his regular 2 mx contacts with 3AKR, 3ATR, 3ATN, 3ANQ, 3ACE, and Bram 5ZAB, of Hynam. The hook-up on Sunday mornings is not as good as it should be. Come on at 10 o'clock and make it a worthwhile effort. The zone congratulates Neil 3HG on his being on the air 25 years, and from what I heard of the little get-together at Neil's QTH, it seemed to be very good. What is wrong with the Ballarat gang, or is it my rx? Haven't heard many on from up that neck of the woods for a while. I think Bill 3AMH must have DF'd himself a nice YL.

5ZAB visited me whilst on holidays in Warrnambool; he had an f.b. time whilst here and his XYL seemed to be having an enjoyable time. Haven't seen or heard of 3ARJ for some time, what's the matter John? Harry 3XI is always on 20 mx on Sundays and seems to work a lot of DX. Also heard on 20 mx was Eric 3ANQ, who seems to be getting his share although he likes 2 mx better. Bill Wines has erected a folded dipole for 14 Mc. and is working out quite well; hears a lot of DX, and the XYL complains of holding the meals up. Hopes to be on 2 mx soon.

CENTRAL WESTERN ZONE

Ran across George 3GN the other day and he informed me that he expected to be on the air again soon as he had acquired the necessary space to erect a decent sized antenna. We will all be pleased to hear you again George. Work on the 2 mx band seems to be increasing in this zone and if the disposals hand-out turns out as expected, guess there will be another couple of signals on this band. Dick 3RR has almost completed a new antenna of the slotted type and he is expecting good results from same. Byron 3TA is replacing his beam array which he lost in a recent storm, so Interstate chaps, you will be hearing some extra signals from Horsham in the near future.

NORTH EASTERN ZONE

Tom 3TS has been heard about, but George 3GD has not been traced lately. Chas 3ACW is to move to Sydney. Vern 3AXW is now taking part regularly in the zone hook-ups, and our Associate Clarry is thinking about the L.A.O.C.P. Syd 3CI and Alan 3UI are "working over" 2 mx with 32 el. beams. Alan uses an 829B final. Frank 3ZU has been listening to 10 and 15 mx. Murray 3HZ has been listening on 40 mx a little, while Brian 3ASF and Ted 3AOB use that band for mobile work, and 3AGG has also been heard there. Kevin 3IR has not been reported on the air from Yarrawonga yet.

Les 3ALE comes on to take the zone hook-up quite often, but Alex 3AT is kept busy in other directions. Peter 3APF is frequently seen about in Shepparton. Johnny 3ACK is heard on 80 mx. Our Secretary, Earle Scoones, now has a BC348 to get into going order. Des 3CO has worked some of the DX on 20 mx. A reference to Les Cusack in Numurkah was noticed recently. It would appear that 3SM returned to Melbourne from Alexandria recently before we knew he was in the zone. Jack 3AKC now on from his new home, but has trouble with noise from h.t. transmission lines in a neighbouring street.

Jim 3JK has been seriously ill lately, but it is pleasing to know that he is on the way to recovery. Ron 3AQG was in to see Howard 3YV recently. Ken 3KR has been away on holidays. Hugh 3AHF has been heard of, but there is nothing, at the moment, on Jack 3PF and his v.h.f. experiments. Henry 3HP and his "off-sider" Des 3BP have been written up a bit in another monthly journal. Lex 3AIL is very happy with his move from Benalla to Oakleigh, but we are sorry to lose him from the zone. Vic 3ABX has been experimenting with 2 mx converters. This leaves Keith 3JC and Stan 3AGT still unaccounted for, also, for that matter, our Associates Jim Harrington and Jim Muntz, however Ken Mercer keeps in touch with radio, and Col 3WQ is as active as ever.

BALLARAT & DISTRICT RADIO SOCIETY

About 45 were present for the July meeting at which Mr. Jack Ibbott gave a talk and practical demonstration on "Binaural" recording, the latest in Hi-Fi audio. Amongst this number were five from Geelong including 3IC and 3ZBR, also 3AGD, 3AKR, 3ZAZ and Tom Kinnersley from way down in the bush between Dunkeld and Westmere. Although your scribe is a communications man, he, like all others, was astounded to say the least at the quality and type of audio which issues forth from the collection of tape decks, amplifiers, speakers, tweeters and woofers. To quote the classics, it stood out like a shag on a rock when compared to what most people would assume was Hi-Fi. The most enjoyable evening for some decades now concluded with supper.

Another signal should be eminating from the realms of 2 mx shortly when a call sign is allotted to Ken Hore, one of the local R.A.A.F. personnel. Activity in this town of about 30 licensed Amateurs is still like 10 mx—very dead. 3HW-3AMH occasionally take great delight in blasting a hole in 20 mx, complete with rock crusher action to the annoyance of 30 s.w. rx's and all b.c. rx's within the shock wave. Nevertheless, it delights the Ws from the East to the West coast.

GEELONG AMATEUR RADIO CLUB

Members have at last completed the new syllabus for 1955-56 and a great variety of new features has been included. Each Wednesday night at the club rooms this year will be an official evening. Ron 3AYB gave an interesting talk on the development of semi-conductors and transistors. At the conclusion of his exposition club members had to be told to go home so great was the discussion and question time which followed.

Ted 3AEH has constructed a number of small 2 mx transceivers which work very well. Bill 3AWZ has his test equipment up to date with the addition of a new monitor and a 100 Kc. crystal oscillator secondary standard. Fred 3ALG has a super rx and can hear all the DX round the place. Bob 3IC (old faithful) is as usual conducting the morse evenings for interested members.

We will all be pleased to see Melbourne friends at our QTH throughout the year, especially on Wednesday evenings.

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QUEENSLAND

TOWNSVILLE

The usual monthly meeting was held at the residence of 4BX on Thursday, 2nd June. The chairman received many apologies from members and the meeting soon got under way, and after disposal of usual business, the crowd adjourned to the top of Castle Hill in company of Mr. W. Parker to hear and see all about the D.M.E. This was really enjoyed and due to the lateness of the hour only a few returned to dispose of the ample refreshments.

4EJ has only the driven element on the tower so far and is putting out hefty signals on c.w. 4HV's modulation sounds a lot better and comes on the air at all weird times when people should be in bed. 4LR chasing DX and getting a few with his low power of 10w. and 3 el. beam. 4BE, who has not been heard for a long time, was heard in QSO with 4LR while writing these notes. 4LK, 4JW and 4WT all worked on 7 Mc., but this band very poor due to QRN, etc. 4RW hopes to see many of the boys in Brisbane in August during the Exhibition and hopes to attend the monthly meeting.—4RW.

ROCKHAMPTON

As the date set down for the last meeting clashed with the Rockhampton Show, the meeting was cancelled as it was realised that at this time at least Amateur Radio would take second place to family and business interests. Following the departure from the zone of John ex-4FU, last heard operating under 3AFU/VK2 at Woy Woy, it is pleasing to note that a new licensee, 4CY, is operating 20 mx phone in the district. Noel 4ZAR is contemplating matrimony and also pounding brass. Recent advice to Bob 4NG indicates that the Ross Hull Memorial Trophy is his for a period. Bill 4WD and Charlie 4MT also assisted in placing Rocky on the 6 mx map. "Grand Dad" Eric 4EC is on the market with a nice line of polystyrene beads ex-war surplus co-ax which only lasted seven years. Let's hope your new transmission line lasts as long and works as well, Eric. Following recent events in the Dodd household, Bill 4WD (wild dog) is expected to produce a new QSL card carrying a picture of the newly arrived four pups. Des 4TL is expected to make a comeback soon, but is being delayed by his interest in light aircraft and a YL.

Intending visitors to Sunny Queensland are advised that Rocky Zone meetings are held on the 15th of each month and Interstate visitors are really welcome. We recently had the pleasure of entertaining Lance 3AHL and trust that as he has demonstrated that it can be done, others will follow his tyre tracks.—4NG.

MARYBOROUGH

Old-timer Gordon 4GH came up on 40 and 80 mx after a two-year break. 4AI also broke a long silence by re-appearing on 20 mx with a new rig and 40 ft. high double-extended Zepp; Alan is knocking over some new countries on phone. Arch 4CB is getting a 50 ft. steel tower together which will later hold a 14 Mc. 4 el. beam. Meantime Arch is getting started on 2 mx in company with 4AI. Other locals look like following suit and before long will be looking for inter-town contacts.

4BG has his ZL special beam working, or partly so, on 14 Mc.—with a rotating pipe mast. Ron is heard every Sunday keeping his 20-year-old sked on 40 or 20 mx with cousin 2BG. Newcomer Graham Pooley sitting for A.O.C.P. in July. Good luck Graham.

BUNDABERG

4XJ and 4BJ have both acquired commercially built v.f.o. units. Les works c.w. and phone on 14 and 28 Mc. and snares some rare ones. 4BJ is in a pre-breakfast 7 Mc. hook-up. When are you going to put that tower up, Vic?

SOUTH AUSTRALIA

The monthly general meeting of the VK5 Division took the form of a visit of inspection to the Osborne power house, which, for the benefit of the scribe for the Headquarters Division and any others who may not be aware of it, is the main power house of the Electricity Trust, of South Australia. About 60 or 70 members left the club rooms at about 7.15 p.m. and journeyed the twelve or so miles to Osborne, in motor cars of all shapes and vintage, and arrived at the gates of the power station to be met by Gilbert 5ZAT and John 5KX, who escorted the party up to the main doors. Gilbert gave a short description of the mechanical side of the power house and then John did the same for the electrical side. The party then broke up into six separate parties under guides and commenced their tour of inspection.

Unfortunately, I was not present at the inspection, due to being otherwise engaged. To tell the truth, at dinner that night I happened to say to my XYL that I was going out to have a look over the power station, and she very sweetly said to me that instead of going to see where the electricity was made, it might possibly be better if I fixed up a few of the electrical pieces of equipment laying around the house, such as the iron, toaster, jug, etc. Naturally being a perfect husband (the words are mine!!), it gave me much pleasure to stay home and oblige, and therefore I missed out on the trip. To be frank, I detected in the tone of the voice of the XYL, that certain something which is distinctly audible to the trained ears of a married man, which says "look out, this is it, duck for cover!" Need I say any more?

The visit of inspection was thoroughly enjoyed by all present and in the few short words of thanks which Gordon 5XU very ably said at the conclusion of the visit, he managed to convey just how much the boys had enjoyed the night. I have it on the best of authority that although I was not present, my name haunted the members all night because practically all of the equipment at the power house was labelled "Parsons," which naturally was the cause of much merriment and insulting remarks at various times during the visit. It goes without saying that as the meeting night took the form of a visit, no general business, etc., etc., took place, and as I have never been guilty of padding my notes just to get space in the magazine, then this brief reference to th meeting must suffice.

Country members now receive with their tapes a gestetnered sheet of a survey of the tape lecture, circuit diagrams where possible, anything of special interest from overseas magazines, in fact anything that the Division feels is of any help to the country member. If any member from the country is not availing himself of this service, then he should get in touch with Gordon 5XU, who is handling this service, and he will do the rest. Now it is up to you, help us to help you. That's what we want to do, but if we don't know what you want, it makes it a bit hard.

Incidentally, don't forget that the August meeting night will take the form of a members' display night and it is up to all to see that we have a display of all those little bits and pieces which usually adorn the average shack. I presume that Council will endeavour to offer some incentive to members to bring along samples of their ingenuity, although this is only an assumption on my part, but whichever way it goes, all members should try and make the evening a success. No matter how big or how small, if you made it yourself, bring it along and let the other fellow see it. Surely the idea appeals to you?

Frank 5BU at the time of writing is an inmate of the Repatriation General Hospital at Springbank. From all information to hand he is doing as well as can be expected and we all hope that he will soon be on his feet again. Alan 5VO is now out from the Royal Adelaide Hospital and slowly on the way to his usual good health. I understand that one or two minor bits of patching up have still to be done, but Alan has relegated them to the future. The distant future we all hope, OM. Frank 5MZ has returned to work again although he has to look after his leg still. Judging by his cheery voice that I hear on 40 mx quite frequently (suggest you transmit instead of only listening, "Pansy."—Ed.), he is almost back to normal. Nice work, OM.

The Brompton Methodist Mission Youth Club as part of its activities is running a radio club under the guidance of Howard 5XA and Joe 5JO. I have it on good information that a transmitting license is part of the plans for the not-too-distant future. A worthy effort OMs.

SOUTH EAST AREAS

The monthly meeting of the S.E. boys consisted of a general ragchew, which for some reason or other always seems to go over well whenever Amateurs get together. Three of the boys were absent, Claude 5CH, Tom 5TW and John 5JA, which meant that Col 5CJ and Stuart 5MS did not have to fight over the last piece of sponge cake. 5KU has been heard pounding the key on several occasions this month although conditions did not promise Erg much reward. 5CJ has been on 40 and 2 mx with his usual skeds, but business is holding up Col's own building programme. 5TW has been reported as missing this month, but the reason, or the supposed reason for his absence, is the fact that it has been on the cold side. If I might be so rude as to offer a comment Tom, that is a decided under-statement.

5CH has been seen in the City of Churches —Adelaide to you, Pincott!! Claude called in to see me at the b.b.s.s. (best broadcasting station in the State to the uninformed—5DN to wit) and gave me a detailed report on his activities, both personal, Amateur and commercial. 5FD has not been heard on the air, but attended the monthly meeting. 5ZAG is still working on his beam and expects to have it working ere long. Leo has been spending quite a deal of time re-building an AR8 type rx. From information received I can hazard a guess that it won't be long now before Leo removes that Z from his prefix. Keep up the good work OM.

No news from Narracoorte this month, but this means that it is good news. Understand that Bram 5ZAB is on holidays in VK3, and the good news part of it is that he managed a contact on 2 mx from Narracoorte with Max 3BQ. The ex-VK5 v.h.f. scribe, Gordon 5XU, in the course of chiding me for attempting to poach on the new v.h.f. scribe's territory, informed me that the QTH of Bram is Hynam, not Narracoorte. My apologies to both gentlemen. 5MS seems to be the only one of the boys that has been really active this month. He has been keeping skeds on 40 and 20 mx, to say nothing of 80 mx. Stuart is building a xtal converter for 2 mx.

There are two things in Amateur Radio that I never do. One is never to read the VK3 notes more than six times (just in case I can secure grounds for libel, plague—plagge—plagiawis—stealing my thunder, in fact anything that would give me grounds to sue), and the second is never to read the notes of Pro-5PS. However, one night last week I came home a little bit late and the XYL said that my punishment would be to sit in the corner and read the last notes that Pro-5PS wrote in "Amateur Radio." I screamed for mercy and swore that I would never do it again, but to no avail. Imagine my feelings when I read in the first line of the South East notes that Stuart 5MS had been given by Pro-5PS the credit for organising the monthly meetings in that area. Knowing Stuart as I do, I could imagine just how embarrassed he would be at this honour being thrust upon him, especially as I had credited two others for the organising of the meetings in one of my earlier notes. I thought to myself, if I say anything to Pro-5PS, he will only tell me just what I can do with my notes each time I go on my annual holidays, and if I keep quiet nobody will know anything about it. Therefore I decided to say nothing about the matter to Pro-5PS, and as I know he never reads my notes for the same reason that I don't read his, then all will be well. Diplomatic am I not, fellows?

Once upon a time I used to receive a monthly letter from Tom 5TL giving me an up to the minute story of the doings of the boys at Renmark, Berri, etc. Since he shifted to Alice Springs he has been strangely silent. He still sends an occasional letter to the operator of 5WI, and I find by looking over the shoulder of the said operator of 5WI that Alice Springs is slowly but surely accumulating quite a number of licensed Amateurs. Should this catch the eye of my one time palsy-walsy Tommy, it might spur him into once again dropping me a letter occasionally.

With regard to the Upper Murray gang, I can only assume that I am in their bad books. Actually I am in most people's bad books and am by now case-hardened to being one of the untouchables, but quite a number of Amateurs that I have contacted ask me just what has become of the Upper Murray boys? This possibly applies to any of the country areas and naturally the only way that we can get any information about them into the magazine is for someone to drop me a short line and give me a lead. I have said before and I say it again, I don't need much to make a lot of it, but I must have a lead. What about it fellows?

Well, believe it or not, this is the end of the notes for VK5 for this month. I have tried as hard as hard can be to stretch them out longer, but even I must confess myself as beaten.

TASMANIA

The July general meeting was held in the club rooms in Liverpool Street on Wednesday, 6th July. There was a most satisfying roll-up of members and friends, and seating accommodation was really at a premium. With President 7FJ in the chair, general business was rapidly disposed of in order to make way for the highlight of the evening—a lecture on Radio Astronomy by Doctor Reiber, of the Research Corporation of America.

Doctor Reiber traced the development of Radio Astronomy through past years up to present day methods, and used lantern slides to illustrate equipment in current use. At the conclusion of his lecture, he answered various questions, and then 7CH tendered the thanks of the Institute for his efforts on our behalf.

Doctor Reiber's lecture proved extremely interesting and thought-provoking, and was greatly appreciated by all present. It is hoped that he may be able to favour us again before he returns to the States in three months' time.

Bert 7BC has not been idle since his transfer to Stanley and has a complete rig functioning on 50 Mc. You should be in the running for some cross-Strait 2 mx work Bert, so I trust you have not abandoned 144 Mc. altogether. Bob 7AF is testing his new antenna. Hope the good work going into that caravan produces satisfying results. Paddy's (7PM) signal should jump quite a few db. when that new h.t. transformer goes into service.

A meeting of those interested in the elimination of noise interference was recently held at the 7RX QTH, and was attended by 7OM, 7LE, 7RX, Associate Don Porthouse, and Harry Melling of the Wireless Branch. It was decided to investigate the noise in the Moonah area first, using the 2 mx band and the Wireless Branch is co-operating with equipment and transport. Good hunting, chaps.

Another point of interest is that it has been decided, in future, to record lectures for replay in other parts of the Division and this should prove most beneficial to those members who, for various reasons, cannot be present when the lecture is given. As a start in this direction, Doctor Reiber's lecture was taken on tape by Barney Watson.

7AL advises that some good 80 mx hook-ups are now being achieved on the Sunday morning 7WI broadcasts, so if some of you more distant members are having strife on 7 Mc., it will probably be well worth while investigating the merits of the 80 mx band. Tom also tells me that I got a bit ahead of the builders in last month's notes so, for the record, I now move Tom back to his old QTH at Thirza St. At the time of writing, 7RY and 7BJ are enjoying a spot of recreation leave and both are actively engaged in interior decoration work.

While this particular para. need not necessarily be taken as a "for sale" notice, I have it on good authority that Associate Don Porthouse has acquired a healthy collection of Hallicrafter Rx's, so go to it chaps, and remember, if you must burgle, don't bungle.

Hearty congrats are due to Ken 7KM on winning an Atomic Energy Commission Scholarship for Research. Ken's present research activities are centred on Wilson Cloud Chambers and Neutron Counters. Only one thing has me worried Ken, don't forget to leave a few minutes out of that schedule for 7KM. Heard 7CT's name mentioned as a participant in recent car trials. 7SW enjoying the luxury of a new car with vacuum wipers. Saw 7AX looking most prosperous at the last meeting. Secretary Bill Tait seems to be enjoying life with a vim that has to be seen to be believed. 7FM has a new rx on the production line and well under way. Barney Watson locked up the workshop as usual and retired—leaving 7FM on the wrong side of the door. 7RM active on 40 mx and pulling 'em in.

In closing, may I remind you that the R.D. Contest commences at 1800 hours E.A.S.T. on 13th August, so you have only a few days left to make sure all is well with the rig. Inactive members are urged to make an effort for the Contest—if your equipment is right on the ice, or, as yet, non existent, contest rule number 5 may provide the answer.

NORTHERN ZONE

Our June meeting at the 7EX library was well attended and the hand of welcome was extended to Morrie Taylor, who has joined us as an associate. We certainly had the scoop of scoops at this meeting as the I.R.E. made available to us Prof. Baxter's magnificent Convention lecture on "Atomic Energy." If this talk should go to VK5, we hope 5PS doesn't squirm too much when he hears the news that S.A. may be the first to get a power reactor. (S.A. has to import its coal for power generation.) 7GM has solved the problem of

making a pi network operate into a dipole and is very happy about it. 7LZ has been very busy touring the State, whilst 7PF and 7LX with lots of work on hand have little time for Amateur Radio. 7LE paid a visit recently to Northern parts and told with great glee of a hidden tx hunt down South. That visitor from the wide open spaces, 7PM, was noticed in town recently, quite a stranger up here, Pat.

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PAPUA—NEW GUINEA

Roy 9AU tells of being active on 7 and 14 Mc. phone and c.w., working Ws, FM7, TI, XE, CO, etc Roy has set himself the task of trying for W.A.S.—has 32 States up and 16 to go. Peter 9RM also bent in that direction, in fact got quite a hump they say, what with his ear glued to the speaker. 9AU has solved the problem of working Ws with no input to the final. Happened to glance at his final meter one night which showed no mills. Checked volttage and had 50 volts on plates of final tubes, asked the W to stand by while new 866s were plugged in. W replied that only 1 or 2 S points difference when on 100w.! Trevor 9TC on relieving duty in Kavieng reported to have gone through 9AU's junk box before leaving, and rumour has it that Roy will be having some local QRM when Trevor returns from Kavieng. Trevor had a very few words to say over a recent Sunday morning hook-up from Harry's QTH, 9HO. Hope to be hearing you from your own QTH soon—in Wewak.

The Madang gang seem to have gone into smoke. 9CR, one time very active, conspicuous by his silence. 9CS not heard at all. Madang must have something to keep all the gang so silent. However, there is a likely starter in George de la Harpe, of D.C.A., who has expressed keen interest on his frequent visits to Amateur shacks in Wewak. The grape vine tells that 9CR is holidaying in Melbourne and meeting some of the VK3 gang. Doug 9DT at present in Moresby. Most likely be adding to the QRM emanating from that region on occasions. Frank 9FN tells of a terrific power leak which seems to be most active at present with an S8 signal. Hope you chaps get rid of it before the R.D. Contest. Affected are Doug 9DB and our worthy Secretary, 9OQ. They have gone into a huddle about it in an effort to eradicate the pest. Hope they run it to earth.

At last the Kavieng gang have made a move to overcome the silence from that island. Harry 9HO been on the last couple of Sunday mornings on the net. Harry has been cooking transformers quite consistently; hope your worries will soon be over Harry. Harry also tells that Carl 9YT has a great pile of gear. Incidentally, Carl is still on furlough somewhere in the States.

Peter 9PF always busy seeing the planes come in safely. On the air occasionally when time and circumstances permit. Peter 9RM working DX and teaching the younger generation the mysteries of Amateur Radio, likewise Ron 9RC. Ron 9RG has some influential friends we hear. A 36 ft. tower is being erected; need we say more. How do you get on to these things, Ron? Bill 9BW trying to get on to 144 Mc., but pretty busy. Bill 9WP scheming to make an impression in the R.D. Contest.

— . . . —

CORRESPONDENCE

The opinions expressed in these letters are the individual opinions of the writer, and do not necessarily coincide with those of the publishers.

RE VK6MK'S LETTER

Editor "A.R.," Dear Sir,

I was pleased to read the replies of VK3XU and VK3ZAQ to VK6MK's letter. I agree with all they have said except that I do not agree that VK6 is disloyal. The discrimination to which VK3XU takes exception was caused by the proposed amendment to the VK6 Constitution (to allow Limited Licensees full membership) being lost, mainly, in my opinion, through the efforts of VK6MK. Tom, at his own expense, sent to all members in W.A. copies of the letter published in June "A.R." At the bottom of the letter was a vote by proxy form. The number of "no" forms received was greater than the number of members attending the meeting. In other words, the proxy voters, not being present, heard only one side of the argument—Tom Mulder's. (Whether, in our friendly society, the independent action of canvassing votes to support one's own point of view is sporting or in the best interests of the W.I.A. is another question.)

Tom, in effect, says if a bloke does not work on a set of bands he cannot understand the problems, etc., there and cannot properly represent members if he doesn't know the troubles. Well, if that is so, that wipes me out from taking office again, as I have never been above 144 Mc.

In the 1920s and 30s Hams were experimenting on the 40, 20, 10 and 5 metre bands. We refer to the real "Ham Spirit" of those days. That same spirit is apparent today, and particularly among those full members and limited licensees who are breaking new Ham ground on the v.h.f., with the equipment the average Ham can afford. Most of those who are content to remain on the old bands are there mainly for the pleasure of DX contacts and ragchews. We are inclined to rest on our experimenting efforts of years gone by. Experimenting of course still goes on in these bands, but I maintain that the most valuable bands for the true Ham experimenter now lies from 144 Mc. and higher. Should any of these Limited Licensees ever be elected to Council, Federal or local, I with 25 years' Ham life behind me would be quite willing to leave the W.I.A. interests and my own, in their hands.

—JACK HOAR, VK6OR.

Editor "A.R.," Dear Sir,

I would like to draw the attention of members of the Wireless Institute to the position of the Limited Licensees in Western Australia.

At the last annual general meeting of the W.A. Division, a motion to admit L.L's. to full membership was defeated. W.A. was the only State to exclude these licensees from full membership.

Criticism of W.A's. action has now extended beyond this State and the two letters published in last month's issue of "A.R." show how strong is the feeling in some quarters. In particular I would like to comment on Gordon Weynton's (VK3XU) letter. His forecast that there would be unrest and schism within the Institute has already occurred. No L.L. who has not already joined the Institute is prepared to join. Even when the position is altered, the treatment received by them will not encourage them to join the W.I.A. (W.A. Division). Most of them do desire to join the W.I.A. but not as Associate members.

I wonder what VK3XU's comments would have been if he had known that under the present Constitution and By-Laws of the W.A. Division, Limited Licensees cannot even be admitted to Associate membership! I quote from the By-Laws:—

"1. Associate Members. Article 28b: In order to satisfy the Council as per Article 28 (b) qualifications for an Associate Member will be accepted only as follows: (i.) Those who have attained a degree of Technical Proficiency in any branch of Radio or Electronics greater than than that required for the A.O.C.P. (ii.) Those who are undertaking a regular course of study leading to the A.O.C.P. by either class attendance, correspondence or who are under personal guidance of a full member who shall vouch for him annually. The Contract of Membership shall be for the current financial year and subject to renewal by Council who shall ensure that the above course of instruction is being maintained."

[Article 28 (b) provides that there shall be an Associate Grade of membership.]

No one would be prepared to argue that the Limited License is a higher qualification than the A.O.C.P. Also not all L.A.O.C.P. holders are, or even want to, study for the full license. Even if they do their membership is temporary and subject to renewal at the end of a year.

If the W.A. Division is to remain truly representative of Amateur Radio and the W.I.A. in this State, then it must get the L.L's. into its membership, i.e. **full** membership.

It will be argued that the Constitution cannot be amended at any meeting other than the annual general meeting next year. However, the way is open for the Council to decide to admit L.L's. to full membership under the provisions for equivalent qualifications. The Constitution can then be suitably amended at the meeting next year.

If the W.A. Division does not take this step, then the other State Divisions should consider giving VK6 Limited Licensees the opportunity of joining their Divisions. Whether they can still recognise the W.A. Division as representing the W.I.A. is then up to them.

—WALLY HOWSE, VK6ZAA.

AWARDS FOR LISTENERS

Editor "A.R.," Dear Sir,

I read with some interest in "A.R." for May, '55, that any Amateur in the world may apply for a W.A.V.K.C.A. award. I also read that there are other cards to be had for working DX, etc., by the Ham.

Now what about the humble Listener, some of whom take their listening very seriously?

I would suggest a Heard C.C. I suppose for those DX fans and would also suggest most positively a Heard All VK Card for each band. How many bands can any listener say he has verified for all VK? From VK1 to VK9 I have no band verified for all States. It's quite a job I can tell you and a negative result is not for want of trying.

The card could be a small one, about the size of the ordinary QSL, and could show the Heard All VK for a heading with the particular band written in an appropriate space. Thus one printing would suffice for all bands. The usual signatures would be shown and the W.I.A. badge. A small token for a large effort, but it would give s.w.l'ing quite a lift and give Associate members an aim to show publicly how well their bomb receiver works.

—NORMAN G. CLARKE, VK2 Associate.

[The 1955 Edition of the Australian Radio Amateur Call Book lists, on page 133, some overseas awards which are available to s.w.l's. —Ed.]

HAMADS

1/- per line, minimum 3/-.

Advertisements under this heading will only be accepted from Institute Members who desire to dispose of equipment which is their own personal property. Copy must be received by 8th of the month, and remittance must accompany advertisement. Calculation of cost is based on an average of six words a line. Dealers' advertisements not accepted in this column.

FOR SALE: Eddystone S680/2, best offer over £70, see advertisement in July "A.R." everything from 3" C.R.O., two thirds of listed price. P. J. Grigg, 3 Philpott St., East Geelong, Vic.

FOR SALE: SCR522 Xmitter with valves, £6/10/-. Three 812A valves, new, 25/- each. Two Bud neut. condx., new, 15/- each. G. Wilson, 31 Glenview St., Greenwich, N.S.W. (JF 2427).

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SELL: BC348 Rx, built-in 85 Kc. Q5-er, N.L. and illuminated National S meter, matching spkr., pwr. supply, and handbook, £50 or exchange for good 35 mm. camera. Eddystone Wavemeter, 1.5 to 160 Mc., with coils and calibration chart, £10. Modified Command Tx, 7-9 Mc., £6 (spare set of tubes). Modified AT5 with all-band final, and built-in xformer and rectifier for 24v. relays, £8. Modulator for Class B 807s, zero bias, £10. Pwr. xformer, A & R 1,000v. a side at 300 Ma. tapped, two 866 rectifiers, fil. xformer for 866s, two filter chokes at 300 Ma., three oil filled 4 uF. 1,500v. condensers, and 400v. a side at 100 Ma. xformer, £20 the lot or will separate. 813 and socket (ceramic), £2. 830B, £1. Four 6J6s, £2. 6BQ7A, £1. 6BE7, £1. Eddystone condensers: 25 x 25 tx split stator, £2; two 8 x 8 butterfly, £1; two 60 pF., £1. V.F.O. Dial and two switches from T.U. tuning unit, £3. P. D. Williams, High School, Maryborough, Vic.

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